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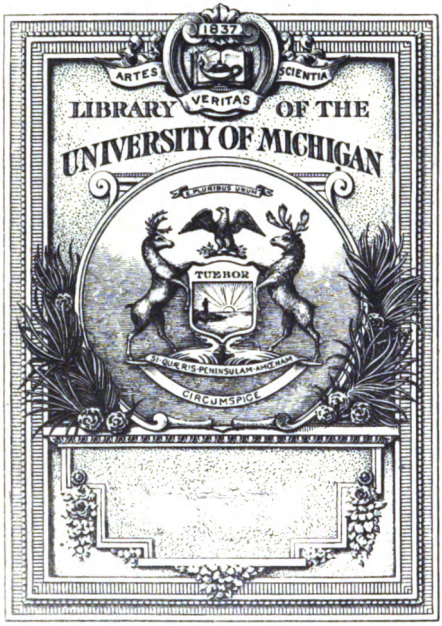

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THE STUDY OF WAR

FOR

STATESMEN AND CITIZENS

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THE STUDY OF WAR

FOR STATESMEN AND CITIZENS

LECTURES DELIVERED IN THE UNIVERSITY OF LONDON DURING THE YEARS 1925–26. EDITED BY MAJOR-GENERAL SIR GEORGE ASTON, K.C.B.
LECTURER ON MILITARY HISTORY, UNIVERSITY COLLEGE, UNIVERSITY OF LONDON

WITH INTRODUCTORY ADDRESS BY THE RIGHT HON. VISCOUNT GREY OF FALLODON, K.G.

'There is nothing more fearful than ignorance in action.'
GOETHE

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INTRODUCTORY ADDRESS

BY VISCOUNT GREY OF FALLODON

(On the occasion of the delivery of the inaugurating lecture of this series at University College, Gower Street, on November 12, 1925.)

THERE are three aspects from which the study of war may be considered. There is the study of war as a part—a very considerable part, unfortunately—of human history ; and therefore, of course, all professional soldiers and sailors ought to study that, in order that they may, if called upon to command armies and navies in war, avoid the mistakes which have been made by their predecessors. The best General is the one who makes the fewest mistakes.

Another point of view from which war should be studied, not merely by professional soldiers or sailors, but by civilians, is that it is exceedingly necessary—and nothing exemplified it more than the last war—that, as we are governed not by soldiers and sailors but by civilians, civilians who are likely to play a part in the government in time of war should study the principles of war, and particularly the great mistakes which civilian

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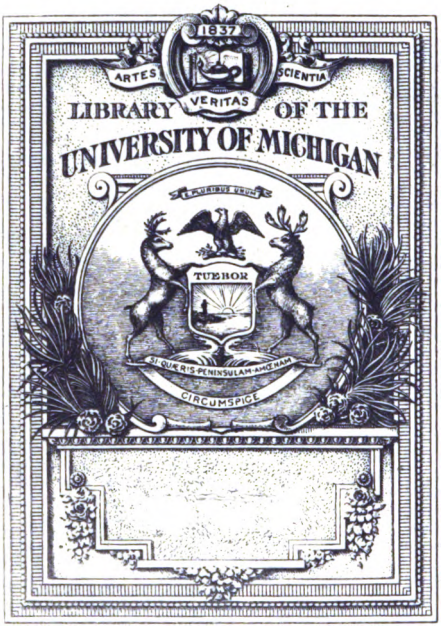

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governments have made in military and naval strategy in past history. You will find plenty of them in the last war, and I am sorry to say that I must take my share in the responsibility for some of them.

The third point of view, which is very important for all educational institutions, is that each generation should be brought up to realise what modern war means. In my boyhood we were all taught what war meant, but we regarded war as something very different from what we now know that it means ; and it is by bringing home to each succeeding generation what the realities of modern war are, how vastly more catastrophic and disastrous it is to the whole population than ever before, that we shall form a public opinion which will help to secure peace. It is, therefore, especially essential that the study of war in all educational institutions should be brought up to the point of bringing home to each generation what modern war really means, in order that we may have, in succeeding generations, a public opinion, not only in this country, but in other countries, which understands that it is to the interest of nations that they should avoid such things as the last war. The study of war would show that any future war will be even more disastrous and destructive to human life and property than the great experience we have all been through.

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EDITOR'S PREFACE

Most of the lectures embodied in this book were arranged by the Military Education Committee of the University of London, with the approval of the Senate. Those dealing with the study of war and with land warfare were delivered at University College ; sea warfare was dealt with at King's College ; chemical warfare and air warfare at the Imperial College of Science. All attracted large and representative public audiences. No discussions followed the lectures when originally delivered, but ' The Study of War ' was subsequently discussed by British and American historians at their conference at the Institute of Historical Research in July 1926. The paper entitled ' A Defence of Military History ' was read by Sir Charles Oman on that occasion. ' What should we Teach about War ? ' by Mr. G. F. Bridge, appeared originally in the *Journal of Education*, and is included in the series, with due acknowledgments, on account of its valuable constructive suggestions about the place to be accorded to warfare in the early stages of historical study.

Taken as a whole, the lectures convey to ' statesmen and citizens ' the views of leaders of thought

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in the three fighting services about the functions which those respective services should be prepared to perform in the interests of the nation and Empire which they serve. Such knowledge is essential, but incomplete. Before the ideals put before all educational authorities by Lord Grey of Fallodon in his introductory remarks can be attained, it is necessary to pay continuous attention to aspects of modern war which affect the lives of statesmen and citizens more directly; to such subjects as preparation, control over war operations, economic warfare, finance, the use and distribution of man-power in war, sea blockades, war exhaustion, and other cognate matters. It is hoped that these needs will be met in due course by the School of War Studies, which has now been established in the University of London.

GEORGE ASTON.

WOODFORD, SALISBURY,
1927.

NOTE.—Some additional comments will be found on pages 148, 172, and 194.

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THE STUDY OF WAR

BY SIR GEORGE ASTON

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THE STUDY OF WAR

BY SIR GEORGE ASTON

In November of each year the nations celebrate, by methods which vary according to national and individual temperament, the anniversary of the conclusion of the most widespread and devastating war of modern times. The object in this paper is to discuss the need for the study of war by those who do not belong to the fighting forces, referring briefly to proposals now being adopted to meet that need in the University of London. The principal points which seem worthy of attention are (1) that ignorance is one of the causes of war, only to be cured by knowledge of its nature, and (2) that it is the duty of those who conduct operations of war to prepare themselves by study to bear that heavy responsibility. Let us first recall our pre-war attitude.

In the supplement to the *Encyclopædia Britannica*, published twenty-three years ago, the following plea for such study appears, in an article entitled 'War':

> There is no standard work on war in the English language, no volume of permanent value which deals with the organisation, maintenance, and employment of armies from the

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point of view of the statesman and the citizen. History, as taught in the present day, includes an immense variety of subjects, but there is one subject which it has sedulously shunned, and that subject is the defence of empires. Hardly any well-known political writer, except Spenser Wilkinson, appears to have the least inkling that such knowledge should be part of the intellectual equipment of every educated man, and no great teaching body has yet endeavoured to supply the deficiency. So, in both Great Britain and the United States, organisation has been neglected, efficiency has been taken for granted, and the national resources have been either wasted or misused. Costly, ill-planned, and ill-conducted enterprises have been the inevitable result.

The article from which that extract is taken was written by the late Colonel Henderson, who was one of the few British soldier-historians whose writings have been widely read by civilians. I refer especially to his life of Stonewall Jackson. The date (1902) when he wrote the words which I have quoted is of interest. They were written during the course of the South African War, when the British Army was much in the eye of the public ; when the ' Two-Power Standard ' was in force at sea ; when the sea supremacy, upon which existence in the British islands depends, was unchallenged by any other nation, when the work of the British Navy involved no fighting, and therefore attracted little, if any, public attention. Had the author lived through the years of the Great War and its aftermath, I think that he would have written differently. First and foremost, knowing the man as I did, I believe that he would have advocated research into the origin,

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nature, and causes of war, with a view to supporting all movements that tend to its avoidance. Then I believe that he would not have confined his attention to armies. He would have pleaded for a standard work, written from the point of view of the statesman and citizen, on the organisation, maintenance, and employment not only of armies, but of the three fighting forces, placing each in its true perspective. British students cannot afford to confine their studies to the continental view of warfare, as simply a question of conflicts between armies. Finally, I believe that Colonel Henderson would have accentuated the point that war, in these days, no longer resembles a gladiatorial combat witnessed by crowds seated in safety around a blood-stained arena. The march of science has brought the whole human race into such close relationship, that the life of every man, woman, and child is intimately affected by the conflict.

Colonel Henderson complained that no great teaching body had, in his day, endeavoured to supply the deficiency to which he called attention in our educational standards. Had he survived, he would have found encouragement for the fulfilment of his hopes in movements that are now on foot, both in America and in Great Britain, towards establishing a systematic study of war. Correspondence advocating the intelligent study of war history in all American schools appeared recently in the *American Historical Review*, and the arguments used therein were so sound that they seem bound to carry weight in time. I hope that more will be heard on that

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subject at the conference between American and British Empire historians, which is to be held in London next July.[1] Meanwhile, we can note an example of movements in the same direction in several British Universities.

During the current University year a course of public lectures is being delivered in London by leading authorities upon different aspects of war, and it is hoped thereby to develop a comprehensive view of the nature of warfare on the different elements. The lectures cover sea, land, air, economic, and chemical warfare. The arrangements have been made by the Military Studies Committee of the University, under the direction of the Senate. No one is likely to claim that the syllabus is exhaustive. The subject of war is too vast, and too full of complications. For instance, there is no special lecture on Economic Blockade, or on Man-power in War. These might have brought home to all concerned the realities of modern warfare, and have acted as an incitement to further study of a subject by which every citizen is affected, but I understand that negotiations with the highest authorities on these branches of study have not, so far, been successful. Let us hope that they will be on some future occasion. Before leaving this short series of public lectures on the study of war, it will be as well to emphasise the point that the underlying idea of their originators is that they may be of service to what Colonel Henderson calls 'statesmen and citizens,' amongst the latter being included specially those

[1] This hope was fulfilled.

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with influence over public opinion, either by their position in the academic world or in politics, or as members of that great force in modern life which has been called the Fourth Estate. The hope has also been expressed that with greater knowledge will come greater sympathy between the British people and the members of their fighting services, whose business it is to carry out behests, and if need be to sacrifice life or health in the cause of the nation by sea, by land, or in the air.

When these public lectures were first advertised, the notice attracted much interest in the Press, and questions were raised about the probable attitude of 'anti-militarists' towards the course. There have been opponents in all ages to the acquisition of nearly all branches of knowledge, and pioneers in scientific truth, like Galileo, have suffered persecution; but no class can ever have been so unreasonable as anti-militarists who pride themselves on their ignorance of the nature and conduct of warfare, and oppose the acquisition of knowledge by study and research. Much depends upon how we define an anti-militarist. Let us assume that he is the opposite to a militarist. 'Without definition,' we were told once by an eminent divine, 'controversy is either hopeless or useless.' Sir Edward Grey (as he then was), at a critical period in British history, defined a militarist as one whose outlook covers only purely material military matters, taking no account, and being incapable of taking account, of the soul which exists in nations. If that definition of a militarist be accepted, the strongest anti-militarists are to be

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found amongst those who are best acquainted with the realities of war, and the abolition of war between nations is more likely to be furthered by knowledge than by ignorance of its realities.

Acting upon such suppositions as these, the authorities of the University of London propose to further the study of the nature and conduct of war by students in their own University. Here, as elsewhere, some difficulty arises over classification. Subjects are classed in 'faculties,' such as the Faculty of Arts and the Faculty of Science, and the question arises whether war is an art or a science. History (which is taught in the Faculty of Arts) is both an art and a science. I venture to put forward the suggestion that war is neither the one nor the other. The most learned disquisition which I have encountered on the question states that war belongs not to the province of arts and sciences, but to the province of social life. It is a conflict of great interests which is settled by bloodshed, and only in that is it different from others. It would be better, instead of comparing it with any art, to liken it to business competition, which is also a conflict of human interests and activities. I borrow that idea from the English translation of Clausewitz 'On War,' which was published in 1908. The editor stated in a footnote that the analogy between war and business competition had become much closer since the time of Clausewitz, and he expressed the opinion that, the first business of States being regarded as the development of facilities for trade, war between great nations was only a question of time. The Great

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War came six years later. It will be as well to follow that point up at once.

Much support was accorded shortly before the Great War to arguments that war for financial or economic profit was a 'Great Illusion'; but we know how little influence those arguments carried in some quarters. A German Chancellor (Count Hertling) pronounced publicly, as late as the year 1918, that economic development in every direction had been Germany's war aim from the beginning, and, since the war, the Carnegie Endowment has published a series of books by eminent Japanese writers who provide striking statistics to prove that the industrial development of Japan dates from, and was caused by, her wars against China and against Russia. The fallacy, if it is a fallacy, that nations, in early stages of their industrial development, can profit by successful war, is still a potent factor in international relationship. Here we find a wide field for research, and a reason for the study by 'statesmen and citizens' of the subject of war, perhaps for the amendment of political economic theories. There occurs to one's mind, in that connection, a bitter epigram which appeared in a recent collection of poems emanating from Oxford. It is based upon the well-known lines by Simonides in memory of the Spartan hero Leonidas and his men :

Ὦ ξεῖν', ἄγγειλον Λακεδαιμονίοις ὅτι τῇδε
κείμεθα τοῖς κείνων ῥήμασι πειθόμενοι

which have been thus, somewhat freely, translated :

Go tell the Spartans, thou that passest by,
That here, obedient to their laws, we lie.

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The parody is entitled 'War Graves,' and it throws some light upon the opinions of the new generation about their predecessors :

> Tell the Professors, you that pass us by,
> They taught Political Economy,
> And here, obedient to their laws, we lie.

With that attitude in our minds, we can revert to our immediate subject, the need to study war, and the movement on foot in the University of London to meet that need. We have noted the proposal to include war studies in the subjects taken up for a pass degree, and the difficulty arising over the question of Faculties. The proposal for solving this difficulty is to offer courses in war studies for pass degrees both in Arts and in Science. Questions affecting the provision of instruction, and the attraction of students, still await adjustment. In connection with the last point, it is important to note a recent failure in the same University to attract students to take up a war subject (the Spanish-American War), which was offered to candidates for honours in History, and a similar experience with facilities offered by the Institute of Historical Research in London for post-graduate study of the Great War, for which a vast amount of unexplored material is available.

With war, as with all studies, the first process, and a very laborious one, would be to ascertain the truth. The next would be to tell it, without fear or favour. The third, and most difficult, would be to persuade people to believe it ; but, before any of these pro-

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cesses can be undertaken, it will be necessary to overcome the indifference which is being displayed towards the study of war, excepting amongst members of the fighting forces whose duties are limited to the conduct of naval, military, and air operations, and the technicalities connected therewith. To overcome indifference is always an up-hill task, but not a hopeless one if the policy is sound, the difficulties realised, and experience gained. It is for such reasons that we have taken note of previous failures to further the study of war history in the University of London. They may possibly be accounted for by a natural reaction from the old method of teaching history, called the 'Kings, Battles, and Dates' method, which ignored the growth of political institutions, the conduct of diplomacy, and the social and economic life of the people concerned. Other contributory causes have been the paucity of literature in the English language dealing with war from the point of view of the statesman and citizen (as distinguished from that of the seaman and soldier), and the use of unnecessary and meaningless technicalities by so many writers on the subject. In a Press summary of the work done at the educational conferences which were held in London in January 1924, we read that specialists and experts in various subjects used a jargon which has to the writer the supreme advantage of being so unintelligible that it impresses the reader and conceals the ignorance of the authority on his own subject. That criticism might have been taken to heart by many expert writers about war; but when all is said, there

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remains the phenomenon that vast sums have been, and are being, expended, to the great benefit of mankind, upon research into the nature, origin, and treatment of diseases, while the general attitude towards studying the nature and conduct of war resembles that of the people of the Land of Hearsay (in Charles Kingsley's 'Water Babies'), whose whole strategy and art military consisted in the safe and easy process of stopping their ears and screaming 'Oh, don't tell us!' and then running away.

Leaving these broad generalities, we will consider definite examples of the value of more intensive study of the subject of war. We have touched upon the need for further research into the economic argument against war in general. Passing now to the ethical argument, we know that idealism in international affairs is still considered to be impossible, in all good faith, by a school of thought, in Great Britain and elsewhere, that has stigmatised it as 'sloppy folly'—so we will approach with caution the ethical aspects of war, although it is probable that, after experience gained since the 'Great Illusion' was written, there will now be strong support for the view that the seeds of war lie in far deeper soil than that of economic advantage. In the ethical field, the most concise definition of war is the one attributed to General Sherman, that 'War is Hell.' That leads us to the reflection that there are different schools of thought, both about war and about hell. These schools can be grouped in two classes, one of which looks upon war and hell as

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altogether evil, and the other looks upon both as cleansing fires which burn the badness out of human nature and force it to improve. The views of foreign authorities who have glorified war, from Machiavelli to Bernhardi, have been treated with opprobrium of late years on both sides of the Atlantic, but we cannot ignore the point that the school of opinion to which I have referred can quote in support of their views many English authorities, from Bacon and his contemporaries to Victorians like Thomas Carlyle and Ruskin. One quotation will be enough. The literary style identifies the author

> England itself, in foolish quarters of England, still howls and execrates lamentably over its William the Conqueror and vigorous line of Normans and Plantagenets; but without them, if you consider well, what had it been? A gluttonous race of Jutes and Angles, capable of no grand combinations. . . . Nothing but collision, intolerable interpressure, and constant battle often supervening could have been appointed those undrilled Anglo-Saxons. Their pot-bellied equanimity itself continuing liable to constant interruptions.

From the view that war improves nations and races, the step is a short one to opinions that idealism is 'a peril to national security'; that the motive of self-interest is the 'mainspring of human conduct'; that ethical standards have no place in the relationship between nations; and that force is the only possible arbiter in disputes. Such opinions are still expressed in influential quarters, although they were held in such detestation a few years ago,

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by the people of the British Empire, that unprecedented sacrifice was endured to defeat them. Over 8,000,000 men bore arms for the purpose, and nearly 1,000,000 of them gave their lives to the cause.

Here, then, we find a strong reason for the study of war, in order to investigate the premisses upon which the arguments of the pro-war school are based. The ground has already been broken, in a paper on 'War and Human Progress,' by the late Lord Bryce, whose historical researches led him to the conclusions that 'we can, with an easy conscience, dismiss the doctrine that war is a health-giving tonic offered to the human race for its own good,' and 'the future progress of mankind is to be sought, not through the strifes and hatreds of nations, but rather by their friendly co-operation in the healing and enlightening works of peace.' I would also call attention, on the biological side, to similar conclusions arrived at by Dr. Chalmers Mitchell in his 'Evolution and the War.' A wealth of other material is available for investigation by a School of War Studies, which in course of time would be in a position to aid in the difficult work of bridging the chasm between ascertaining the truth and inducing people to believe in the conclusions. As another suggestion, which might help in this direction, I mention the value, from the constructive point of view, of Professor A. F. Pollard's little pamphlet entitled 'The League of Nations: an Historical Argument,' in which he traces the law-abiding qualities of the British people

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to the policy pursued by Henry II (on the principle *justicia magnum emolumentum*) towards his turbulent barons. They, like the nations of the present day, recognised no law but that of might.

The natural result was that those barons, like the nations, lived in constant fear of their neighbours. That reflection suggests yet another line of investigation, which might be fruitful in results: an investigation into the causes of those fears. The general opinion is that they are caused by the strength of armaments. I suggest, as an even more potent cause of fear, the state of readiness in which those armaments are kept. Taking armies as an example. The experience of 1870 proved the military effectiveness of 'mobilisation' as a process for speeding up the employment of armies. Recent historical events have taught us that mobilisation now means war, because in some countries it has become a progressive process, including acts of war, which lead inevitably to conflict. The military effectiveness of mobilisation, as a preparatory measure, merges gradually into 'military necessity' during the critical period of final negotiations. The striking of the first blow carries the subject in dispute from the realms of reason to those of passion, and under such conditions subservience to reason or to a law of nations can never be effectively enforced. I commend to students of the Locarno Security Pacts the point that these should eliminate the advantage of rapid mobilisation, and thus help to reduce the fear of neighbours, now so prevalent in continental countries.

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The state of readiness of armaments leads us naturally to the State machinery for putting them in motion, and here we find another object for study. This machinery varies widely in different countries. For instance, in the United States of America I understand that the making of war is the prerogative of Congress. The conduct of warfare is entirely in the hands of the President, but the Senate has the principal voice in the conclusion of peace. This might profitably be compared with other systems, especially those for putting war machinery in motion. Wars sometimes result from emotional impulses of the moment. The influence of such impulses upon various natures of war-making authority would be an interesting subject for investigation. So would the influence of the Press.

While we can now visualise a school of studies in war which, in course of time, would make wars less probable, the most confirmed optimist would not expect to create a new heaven and a new earth in a hurry, simply by research and reason. Human nature must improve before wars cease. Let us, therefore, consider the advantage, both to the statesman and to the citizen, of some knowledge of the lessons to be learned from history about the conduct of actual operations of war. Here we touch familiar ground, the old controversy about 'experts' in warfare. Whether, as has been alleged, the brains of members of the fighting forces who study their profession become petrified by precedents, so that they are incapable of dealing practically with subjects to which they have devoted a life-time of study and

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of practical experience. Whether knowledge of realities acquired by this experience and study, or the faculty of imagination without any knowledge, is the most valuable equipment for the conduct of war operations.

Let us again consult Colonel Henderson's article in the *Encyclopædia Britannica* of 1902. He writes :

> It is not pretended that if military history were thoroughly studied all statesmen would become Moltkes, or that every citizen would be competent to set squadrons in the field. War is above all a practical art, and the application of theory to practice is not to be taught at a University or to be learned by those who have never rubbed shoulders with the men in the ranks. But if war were more generally and thoroughly studied, the importance of organisation, of training, of education, and of readiness would be more generally appreciated ; abuses would no longer be regarded with lazy tolerance ; efficiency would be something more than a political catchword. . . . Nor is this all. A nation that understood something about war would hardly suffer the fantastic tricks which have been played so often by the best-meaning statesmen . . diplomacy and strategy would keep step.

The author puts forward a definite example to illustrate his meaning :

> In all history there are few more glaring instances of incompetent statesmanship than the proposal of the Cabinet of 1813, at the moment when Wellington was contemplating the campaign that was to expel the French from Spain, and was asking for more men, more money, and more material, to detach a large force in the vague hope of exciting a revolution in Southern Italy.

It can be advanced that Colonel Henderson weakened his argument by using the language of

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the protagonist, rather than that of the historian, but the parallel with some of the diversions of military force in the late war will doubtless occur to many of those present. We know that 3,600,000 British Empire troops were employed upon subsidiary operations, but there is no advantage in following up that point. It still remains on the lower plane of personal controversy, and has not yet had time to pass into the higher and calmer atmosphere of history. We can, however, without fear of controversy, take one or two examples, derived from recent experience, of the advantage of some knowledge of past operations of war, and of the functions of sea and of land forces respectively. I know no example of a fleet, without the aid of land forces, having captured a large area of continental territory containing a strong hostile army. Nevertheless, it is on record that the British Admiralty, in January 1915, was ordered to prepare to 'take' the Gallipoli Peninsula, without the aid of troops. The evidence of that written order, which was published by the Dardanelles Commissioners, suffices to prove the need for more knowledge in those who are responsible for ordering such operations, and here we can draw a clear distinction between the conduct of operations by sea, land, and air, and the conduct of war in all its aspects (including the political, diplomatic, economic, and financial). That is a much wider question, requiring wider study.

One more definite example of a need for knowledge will suffice. The opinion was widely held and expressed, even by eminent historians like the

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late Lord Bryce, that we could have defeated the armies of the Central Powers more quickly by sending the bulk of the British Army to Salonika than by sending it to France. In examining that proposal, there is no need to pose as experts, or to use any technical language. It is enough to note that soldiers eat, and that under modern conditions they expend a very heavy weight of ammunition in protracted battles.[1] These and other weights require transport, by rail, by road, or by water, to the armies concerned. If, as has been alleged, we could have struck a decisive blow against the Central Powers by an advance northward from Salonika, we must concede to our opponents sufficient intelligence to assume that they would have sent an army to parry that blow. Let us assume that a battle would then have resulted. In that battle the facilities for transport behind the defending army would have been as five to one with those behind our own force. This disadvantage to the British Army would have increased with every mile of advance. In such circumstances it is not easy to discover the benefit, either military or political, which would have accrued to us, if the bulk of the British Army had gone to Salonika.

It would be easy to overload, with similar

[1] The following figures are of interest in this connection: Between noon on Sept. 28 and the same hour on Sept. 29, 1918, nearly 944,000 rounds, costing nearly £3,900,000, were fired from British guns on the Western Front. In the third battle of Ypres (July 30 to Oct. 7, 1917), and again in the autumn offensive of August 18 to Oct. 27, 1918, the *weekly average* weight of gun ammunition expended considerably exceeded 53,000 tons.

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examples, the argument for the study of war by those who are responsible for the provision and for the most effective employment of the fighting forces. These two have been selected because they involve only questions of fact, about which there can be no controversy. The general subject of detachments from a main theatre of war offers a wide scope for students. It would fill a large book. It cannot be exploited within the limits of a short paper.

Presumably we can take it for granted that there can be no sound reason for any such detachments unless they contribute to a general victory over the forces of an enemy. Concentration upon this purpose demands a sense of proportion, and suppression of self, which require much of human nature. The pages of the history of many nations are stained with the names of those who have sacrificed fighting forces, not with the single purpose of defeating an enemy, to advance some great cause, but for the lesser object of keeping some individual, dynasty, or government in power by pandering to the well-known public demand for successful combats, regardless of their ultimate influence upon the issue of a war. A more widespread knowledge of the realities of war would reduce the popularity of such operations, and place them and their originators in a truer perspective.

Having pleaded for the study of war from the point of view, first of its prevention, and secondly of its successful conduct when it cannot be avoided, there remains a third subject, that of peace-making. Here words are the weapons, not deeds, and I think

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that most people will nowadays agree that, in the long run, words, and the thoughts behind them, can be the most deadly. It is not necessary to emphasise the point that the study of peace-making and of treaty-making in the past would be a useful equipment for those charged with this tremendous responsibility in the future.

This concludes a brief résumé of a few of the arguments which can be advanced in favour of the organised study of the nature and of the conduct of war, but there remains one reflection, about patriotism as a war influence. This great moral force, like the material forces which are placed at the disposal of the human race by great scientists, can be used either for the advancement or for the destruction of mankind. Here we again touch the region of sentiment, where men who feel most deeply are the least articulate. Let us content ourselves therefore with one note about movements to destroy patriotism, substituting 'internationalism' as a means of averting wars. Patriotism, or love of country, is built upon the sentiment of individual families, individual towns, individual counties, or individual classes in life, without destroying family, town, county, or class loyalties. It would seem, then, to be disastrous to destroy loyalty to country, leaving no foundation upon which to build a wider outlook.

Conceding that point, the conclusion to which the study of warfare in the past and its tendencies in the future must inevitably lead will be the same as that arrived at by the great Englishwoman

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whose death we have recently commemorated, that 'Patriotism is not enough,' and, in the words of Lord Grey of Fallodon, that we must 'learn or perish.'

Comments by Lord Grey of Fallodon

Lord Grey of Fallodon, who occupied the chair, commented as follows after the delivery of the above inaugurating lecture at University College, Gower Street, on November 12, 1925:

'I think that you will all feel that Sir George Aston's lecture has been exceedingly interesting, and justified my suggestion that he had a wide ideal of war from the point of view of human welfare. I was interested in one point he made, particularly when he spoke of the fear which is produced by armaments, and more especially the readiness of armaments for war. Nations can never do without armies and navies until they feel confident in the security of peace. We have not reached that point yet. Some people think that it will never be reached, but—and we have seen it in our own time—a generation of mankind sometimes makes extraordinarily rapid advances, and you will find in history one generation arriving at a point of view which to previous generations would have been incredible. As long as there are armies and navies, however (and if armies and navies disappear they must do so all over the world; one nation cannot disarm without the others), war must be studied from the point of view of how those armies and navies can be most effectively used.

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'It may have been urged, before the last war, that the study of war, especially in Germany, predisposed a nation to war, but study there had been based on the management of armies and navies; war was considered as a matter which only concerned armies and navies, and was fought out between them only. In Germany, before 1914, there had been three recent wars—the war against Austria, the war with Denmark, and the war with France in 1870—and these wars were all successful without much affecting the German people, except their actual armies and navies engaged in the fight. I can quite understand that the study of war from such a point of view might have removed in the Germans the apprehension of war.

'The study of war must bring out the contrast between the characteristics of modern war and such wars as that of 1870, and I think that to neglect the study of it, to allow people to forget what it means, or to allow them to give up armies and navies, is an ideal in which a nation cannot indulge without serious consequences that will indeed be more likely to promote future wars. The study of war must be more comprehensive, and must include the economic element which plays so considerable a part in modern war.'

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A DEFENCE OF MILITARY HISTORY

BY SIR CHARLES OMAN

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A DEFENCE OF MILITARY HISTORY

BY SIR CHARLES OMAN

Two generations have now passed since the blessed word Evolution was invented, and was applied as a universal panacea to all the problems of the universe—historical no less than physical or metaphysical. By this I mean that a whole school of historians set forth the thesis that all history is a continuous process of becoming, an ordered movement of development or decadence, a series of inevitable results following on well-marshalled tables of causes. Of course the logician may tell you that every consequence is the summing-up of its antecedents—but that is rather meaningless formal logic. The historians of whom I am thinking meant much more than that—they wanted to turn history into a continuous and mechanical panorama of evolution or devolution, in which processes like the formation of the Roman Empire, the growth of the mediaeval Papacy, or the building up of the English constitution show themselves as typical developments arising from necessary causes.

Now I hold myself that history is quite as much cataclysmic as evolutionary ; that it is not a mere

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logical stream of events, but a series of happenings, affected in the most inscrutable fashion by incalculable things—natural phenomena, the appearance of outstanding human personalities, new inventions and discoveries, not unfrequently by a mere chance of war. It is mainly of this last form of cataclysmic event that I wish to speak to-day.

'Every battle of the warrior,' wrote the Prophet Isaiah, 'is with confused noise and garments rolled in blood.' Between his age and our own there have been many worthy people, including no small number of historians, who have never arrived at any clearer notion of the meaning of military operations than that they involve many loud and discordant sounds, abhorrent to the civilian's ear, and are attended by a lamentable loss of human life. Thus felt many a cloistered chronicler of the Middle Ages, and thus, too, many a writer of more modern times, who strove to justify his personal dislike for, or ignorance of, military things, by depreciating their importance and significance in world-history. Let me quote one typical paragraph from J. R. Green's 'History of the English People,' a work which even to-day has tens of thousands of readers. He writes:

> It is the reproach of historians that they have too often turned history into a mere record of the butchery of men by their fellow men. But war plays a small part in the real story of European nations, and in that of England its part is smaller than in any. The only war that has profoundly affected English Society and English Government is the Hundred Years War with France (1336-1451), and of that war the results were simply evil.

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This is an astonishing paragraph, and the perversity of the mental attitude implied in it seems to grow more gratuitous as we ponder over each of its sentences. Did Green conceive in truth that the campaign of Hastings did not profoundly affect English Society and English Government? Did he regard Plassey and Quebec as negligible happenings in the history of the development of the British Empire? Still more, perhaps, must we wonder at his judgment that the campaigns of the War of American Independence, which forced Britain to give up the old theory of colonial administration, had no effect on the future government of the Empire. We can but in fairness ask, since the historian is long dead, whether he would have persisted that the miserable 'Hundred Years War' was to have more permanent and marked effects on the nation than the war of 1914–18. Would that cataclysm, one wonders, have upset Green's comfortable pacifist theories? One may trace several separate strands of prejudice in the mentality of those who decried military history. One was mere reaction against what they called the 'drum and trumpet' history of their predecessors. The democrat, who has gone to the opposite extreme of unwisdom, and has determined that, as Green put it, 'history is the history of peoples, as opposed to the personal adventures of kings and statesmen,' is prone to decry the influence of individuals on the long tale of the centuries. If 'the people' is to be the protagonist, the historian gets infected with the old 'equalitarian' dislike for figures that seem too

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great to fit into the frame of every-day national life. He will try to whittle down the outstanding personality into a mere typical development of the tendencies of his age and his race—whose greatness shall not offend the susceptibilities of smaller men, and sin against the great doctrine of equality. If the story ends by making the hero a mere incarnation of our race or our 'zeitgeist,' it is all the more flattering to ourselves. And an allusion to evolutionary necessities of time and place may often disguise the real abnormality of the mighty individual.

Against vague theories of inevitable world-movements and regular processes, no fact protested more strongly than the prominence of war in the accepted history of the world. Therefore the attempt was made to decry its importance in the annals of mankind, and to explain that it was normally a mere tiresome disturbing element in human progress, which settled nothing. This is pacifist and humanitarian prejudice falsifying the real record of the ages. It is simply a negation of real history.

But enough of this misconception of history as a thing that is practically unaffected by wars. I look upon war as merely the greatest of the influences that make history 'cataclysmic.' There are others, natural phenomena sometimes,—such as earthquakes, inundations, the desiccation of lands once well watered, and changes of climate. Pestilence, again, has several times left its mark on the history of the world—the great plagues in the time of

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Marcus Aurelius had no mean effect on the enfeebling of the Roman Empire; the Black Death in the fourteenth century absolutely wiped out the Viking settlement in Greenland, and probably thereby retarded for a century and a half the rediscovery of America. But the cataclysm in history is not so frequently due to the result of mere physical phenomena as to the appearance of some individual human being of unusual endowments—and here Carlyle was not so very far wrong in his general theory that the decisive marks in the annals of the world are the 'Heroes,' as he called them, the outstanding figures of men who left their impress on their own time and often on the future also.

Take, for example, Mohammed—I have never yet come across any historian who has made the attempt to prove that the Prophet of Mecca was no more than a logical and inevitable product of the intellectual and economic conditions of Arabia in the seventh century after Christ, and that if *he* had never lived some other prophet must have arisen to launch the Saracen invasion upon the Roman and Persian empires. There have been many prophets of the fighting sort, from Simon Bar-Cochab to the Soudanese Mahdi—but it required a prophet of very exceptional type to frame a theory of militant religion which should sweep over half the civilised world, from no better base than the deserts of Arabia. It is worth while remembering that in the whole of human annals that great peninsula has never again produced a man who has exercised any notable influence outside its limits :

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Mohammed was anything but a normal product of his time and race. At the most all the advocate of evolution can plead is that he had an exceptionally lucky chance before him at the moment when the Roman and Persian empires had just bled each other to a desperate pitch of exhaustion, after a war of twenty years. But such opportunities had occurred before—only there was no Mohammed to take advantage of them.

The founder of Islam was undoubtedly a cataclysmic personage—whose career could not have been foretold from any careful consideration of antecedent causes. But there have been others—take, for example, Alexander the Great. It would be absurd to say that the Macedonian conquest of the Near East, which added Asia Minor, Syria, and Egypt to the European block of states for nine hundred years, was in any way a necessary development from the existing state of affairs in the Levant in 330 B.C. It was only the brain and energy of Alexander which created the Hellenic East. Consider the circumstances—we have only to suppose that Philip II on his assassination had been followed by a son of poor or moderate ability—let us say by Alexander's actual successor, his incapable half-brother Philip Arrhidaeus. Can anyone doubt that the result of such a succession would have been the break-up of the recently acquired Macedonian overlordship over the States of Greece, and a time of chaos? There would have been no Macedonian Conquest of Western Asia, no Hellenisation of Syria and Asia Minor, no Greek kingdoms estab-

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lished even so far east as the Indus and the Sutlej. Not merely three hundred, but a thousand years of history beyond the Bosphorus might have taken a completely different aspect. Or again, supposing Alexander killed at his first Asiatic victory on the Granicus, where he exposed himself most recklessly, or smitten down by the chance of war a year or two later before his career was fully developed—like Maurice of Saxony, or Gustavus Adolphus of Sweden,—it is certain that his imbecile brother and his jealous and factious captains would have failed to carry out the vast scheme that he had designed. Everything turned on the great personality of one man, and his ability for war and organisation.

To cite further instances of 'cataclysmic' personalities would be easy and superfluous. But if once we grant that the fate of kingdoms, nay of whole continents, may turn on the appearance of a great military figure, and on his application of strategy and tactics and organisation to the problems of his day, we cannot refuse to concede that not only his personality but his methods of war must be studied as an important item in world-history. To ignore them, and to hand them over to the study of the military specialist is unphilosophic, and unworthy of the self-respecting historian.

A further deduction follows. Military history must be studied because it gives the explanation of many of the great cataclysms which break up the annals of the world into separate epochs. There have been a limited number of epoch-making

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campaigns and engagements, whose result has changed the whole trend of natural development in a section of the world, yet whose event could not have been foretold from any mere study of constitutional tendencies or economic conditions, or social institutions. The fighting man has occasionally put the clock forward or back in the most unforeseen fashion.

To take an obvious example from our own mediaeval history—the result of the campaign of Hastings in 1066 was by no means a foregone conclusion, and had the fate of that battle fallen otherwise than it did, all the subsequent history of England would have borne a different aspect. It is easy to be wise after the event, and to see how Harold's defeat was made possible by Anglo-Saxon localism, want of a strong executive, and employment of antiquated tactics. But granted all this, it was still quite possible that the Norman invasion might have had another and a less successful end. If the English fleet had contrived to hold the sea, as it had been doing till a few days before Duke William set sail, the overloaded Norman squadron might have been beaten before it ever saw the coast of Sussex. Had the invader been a less skilful General, had he been the ordinary feudal chief, and trusted for victory to the furious rush of his cavalry alone, his expedition would have miscarried—and Domesday Book would never have been written. Had Harold Godwineson used better tactics, and succeeded in keeping his levies in better discipline, he might have founded a dynasty and died peacefully

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in his bed. And suppose that the axe-blow which, as we know, brained Duke William's horse, had fallen instead on the body of its rider and slain him, it is certain that the battle would have been lost, and that the Norman Conquest would never have been completed. For there was no other military figure beyond the Channel, in that or the succeeding age, who had the genius and the initiative required for the conduct of such an expedition. Both the Conqueror himself and his opportunity were unique : it seems safe to say that if he had fallen at Hastings, England would have remained a purely insular state, and would never have been tangled up with continental politics as she was during the reigns of the Norman and Angevin kings, so that her history would have borne a greater resemblance to that of the Scandinavian states, and would have proceeded on isolated lines of its own, as it had done for the last two centuries.

But let us take another and a more modern instance of the way in which military events govern the whole history not only of a country but of a whole continent. The final outcome of the wars of the French Revolution was quite uncertain till the appearance of Bonaparte. It is quite impossible to foresee what might have happened if he had fallen by some chance bullet at Montenotte or at Arcola. A well-known historian once wrote that if Bonaparte had not been Bonaparte, Moreau would have been ! In calling his epigram absurd I do not mean that the French Directory was not fated to find its end at the hands of a military dictator.

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But what ordinary dictator—whether Moreau or another—who had executed a *coup d'état*, would have been of the calibre sufficient to enact the after-career of Bonaparte—to wear the crown of Charlemagne and to carry his victorious arms to Vienna, Madrid, Berlin, and Moscow? It was the personal equation of Napoleon—one of the most cataclysmic of historical personages—that was the all-important thing. The special combination of world-wide ambition, military genius, and power of organisation, in the Corsican, made the first French Empire what it was, and gave the history of Europe the particular form that it was to take during fifteen eventful years of the early nineteenth century. And not only so, but the results of what Bonaparte did, and of what he failed to do, were to exert their influence for long decades after his fall, and to set going many a problem that has not even yet received its solution. The whole history of Europe was deflected by the exploits of an exceptional personage working entirely by his exceptional military ability—making history by battles.

A new deduction now follows. Military events, as we have now pointed out, affect the history of the world in cataclysmic fashion—they have, as a rule, resulted from the appearance of the heroic individual figure. But it cannot be denied that occasionally the fortunes of war have been settled, and the world's history deflected, not by a single commanding military genius, but by a school or succession of leaders not rising to any surprising personal eminence, but applying a system of tactics

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and organisation developed on a national or professional heritage. The best example of this phenomenon on record is the subjection first of Italy and then of the whole Mediterranean world by the consuls and pro-consuls of the Roman Republic. The men of outstanding ability among them were few, and we do not even know to whom we should ascribe the first foundation of the tactical organisation of the legion, the great military machine with its peculiar and effective infantry tactics, which proved capable, when properly handled, of dealing with any possible enemy—with the formidable Macedonian phalanx, with the agile Numidian horse, with the furious onset of a Gallic or Teutonic tribal levy, or with the guerilla tactics of the Ligurian or Iberian mountaineer. Military history must study not only the campaigns of Scipio, Sulla, or Julius Caesar, but the operations of many minor generals reared in the same great legionary school of tactics, if we would understand the rise of Rome to empire.

So similarly with the more modern instances—we have, in order to understand the history of Europe, to study the rise and dominance of other schools of war, such as that of the Tartar or Mongol horse-bowman, the terror of Western Asia and Eastern Europe for more than a century, or the English archers of the fourteenth and fifteenth centuries, the marksmen of Cressy and of Agincourt. Nor must we neglect the history of the Swiss pikemen, who not only created their own small and anomalous confederacy, but were the arbiters of battle—to

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Machiavelli's disgust—on a hundred stricken fields in Italy. The Ottoman Empire, essentially a military creation, is inexplicable without a knowledge of the tactics of the Janissaries and their comrades of the Turkish light horse, who beat both East and West,—as witness Kossovo, Nicopolis, and Mohacs, and Tchaldiran and Ridanieh—and built up an unnatural state which reached from Buda-Pesth to Bagdad, from Kaffa to Cairo. Many of their leaders, the sultans of the house of Othman, were men of capacity, but it was the machine and its tactics which created the empire, though the machine was destined to run down when it fell into the hands of degenerates and imbeciles.

Wherever a military discovery or innovation, in organisation, armament, or tactics, has affected the general course of history, we must investigate and explain it with the same care with which modern historians treat economic and social discoveries and innovations. Otherwise we shall have a lop-sided history of the world, as I fear is too much the case at present, when there are scores who study the development of the woollen industry or of steam navigation, for one who tries to make out the true history of the introduction of gunpowder into war, or of the rise of modern standing regular armies.

That this should be the case seems to me exceptionally strange, when we are at the end of the greatest war that the world has ever known, a war that has shaken to pieces that long-established anomaly, the Austrian Empire, which has turned Russia from an ill-administered monarchical State into

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a still worse administered communistic oligarchy of commissars, and Germany from a military monarchy into a democratic republic. This war has recreated lost states like Poland and Bohemia, and made small states like Roumania and Serbia into very large ones. All this was simply the result of fighting —cataclysmic phenomena on the largest scale. The optimist of the old liberal and evolutionary creed may pretend to believe that the event of the Great War was inevitable from the first—that the cause of liberty must triumph over the cause of militarism —and so forth. But the optimist is deceiving himself and his audience by plausible rhetoric. The future history of the world turned in 1914–18 on purely military problems. Would a great strategical conception, von Schlieffen's 'new Cannae' for enveloping the forces of France by a vast westward wheel in August–September 1914, succeed or not in the hands of the younger von Moltke? Was the submarine, ruthlessly used, capable of bringing a sea-girt state like Great Britain over the edge of starvation to surrender? Would air-raids, by Zeppelins or smaller craft, or the employment of poison gas, or the invention of the tank, have any decisive effect, or any effect at all, on the settlement of a campaign? Is it possible to break by frontal attack a deep system of fortified positions, adequately manned by defenders who have line after line behind them to which they can fall back? I do not hesitate to say that the history of the world turned on these practical military problems, and not on any ethical or metaphysical considerations.

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'Militarism,' over which we now intone edifying funeral orations, was at least twice on the edge of winning the war. Do not let us deceive ourselves by pretending that its failure was from the first inevitable.

Let us grant then that it is right that history should teach on the military side. The directing classes in any nation should have a certain general knowledge of the history of the Art of War, just as they ought also to be instructed in economic or constitutional history. 'What touches all is the business of all,' and it is no more right to hand over the study of military history to professional soldiers alone than it would be to permit no one but lawyers to touch constitutional history. Till some such general knowledge exists it is open to any person, military man or civilian, to 'pontificate' upon one of the necessary functions of the State, without being recognised at once as a crank or a sciolist by the audience that he is addressing. It is not the soldier alone who should know the outlines of the past history of his art. As long as we live under the present form of Constitutional Government, our Ministers will be influenced not only by the precepts of their military advisers, but by the public opinion of their party, and of the whole nation. It is absolutely necessary that they should have some knowledge of their own, and not be bound to accept blindfold the orders of their military mentor.

I know that I am here treading on debatable ground. The perils of 'amateur strategy' have

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been sufficiently insisted upon of late by a good many professional pens. And it has been laid down that on the declaration of war a Prime Minister should simply state to the recognised military authority—the Chief of the General Staff or whoever it may be in different countries—what are the political ends which he wishes to obtain, and then wash his hands of the whole matter, and make no comment, criticism, or interference on what that military authority may do. His duty, in this view, is merely to supply as many men and as much money and munitions as the soldier may ask for. Now this I hold to be dangerous doctrine ; I am fully aware of the perils of amateur strategy, when a Government interferes with or overrules the decisions of the military authority to whom it has given over responsibility. One need only think of the bad times which McClellan and other Federal Generals endured under the Washington government during the Civil War of 1861–65, or of certain incidents in our own history between 1914 and 1918.

But military supreme authorities, like other human beings, are fallible. Take obvious instances. The Austrian Government in 1805 handed over the control of operations against Napoleon to General Mack, a man whose plausible personality and power of self-assertion had gained him an undeserved reputation among soldiers as well as among civilians. He happened to be an incompetent windbag, and in six weeks after the outbreak of war had surrendered the main body of the Austrian army, and let the French into Vienna.

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To come nearer to our own day—the French Government in 1914 trusted its professional advisers at the outbreak of the Great War, and those advisers (who had been pondering over the strategy of a Franco-German War for long years) adopted their famous 'Plan No. 17.' This was a deplorable document, which argued from erroneous premisses to false conclusions, and founded itself on a theory of the old Napoleonic 'offensive à outrance.' Within a month the French invasion-scheme had miscarried hopelessly, and the German armies were within thirty miles of Paris—only to be foiled by their own misguidance, both of the army commanders and of the General Headquarters, which led to the 'Miracle of the Marne.' The man who foresaw what the aspect of the next war was going to be, was no soldier, but the civilian banker, Bloch!

It is obvious that no Minister can say to his country 'I handed over the charge of our war to the proper professional authority, and am therefore in no wise responsible for its results'—which happen to be disastrous. It is clear that the civil heads of the State must retain some power to comment, to criticise, even to quash—though they must use it with all discretion and under terrible consciousness of responsibility. Light-hearted interference with details is, of course, criminal: the countermanding of part of the arrangements of a Commander-in-Chief, while the rest are allowed to stand, is quite as bad. He may find himself, like McClellan before Richmond in 1862, committed to a scheme and then deprived of part of the resources

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with which he was intending to carry it out. Or he may have a new objective pointed out to him, which is not identical with the one on which he started.

Nevertheless, I think that the danger of laying down a rule of strict and rigid non-interference by the civil power is quite as great a risk as the opposite danger of frivolous interference. The head of the State must retain not only the right to supersede a commander whose work has obviously failed, but the right to submit criticisms and suggestions even when his achievements are, on the whole, satisfactory. The better acquainted with the rules of war the Minister may be, the less will he be tempted to interfere without necessity, and the less unreasonable should his suggestions prove. I see no fundamental objection to a supreme War Council, kept in touch with the commander in the field, provided that it is composed of the best-instructed and most capable persons. But interference, amounting to absolute negation of the commander's schemes, conducted by individuals not thoroughly versed in the practical affairs of war, is obviously deleterious. So found the Austrian generals opposed to Bonaparte in 1796–97, when the Aulic Council, not a military committee but a ministerial caucus, kept continually varying the objective prescribed to their commanders, and even interfering with details of the movements of troops in the field. So found also certain British and French generals, if we are not mistaken, during the Great War. But the remedy is not military

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authoritarianism—since Generals are no more infallible than Ministers; and looking down the record of the ages we may conclude that each class has had only too much occasion to rail at the other, and that neither should claim omniscience, infallibility, or omnipotence.

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SEA WARFARE

BY VICE-ADMIRAL SIR H. W. RICHMOND

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SEA WARFARE

I

BY VICE-ADMIRAL SIR H. W. RICHMOND

GREAT wars are followed, not unnaturally, by reactions in thought. Men properly consider whether there be not a more rational method than war of settling their disputes. The wish becomes father to the belief that future generations will differ from their predecessors, and act rationally; so that wars will be no more.

In the presence of such a tendency of thought it seems, if not impertinent, at least a waste of effort, to make a study of war: and this same thought has occurred to students in earlier times. Jomini, writing in 1837 his 'Précis de l'Art de la Guerre,' said: 'It is perhaps foolish to publish a book on war at the present time, when the apostles of universal Peace alone are listened to.' So, too, Sir Edward Creasy, some fourteen years later, thought an apology necessary for writing about battles. 'It is an honourable characteristic of the spirit of this age that projects of violence and warfare are regarded among civilised states with gradually increasing aversion. . . . For a writer therefore of

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the present day to choose battle for his favourable topic would argue strange weakness or depravity of mind.' Yet four years later there was a great war with Russia: within nineteen years Prussia forced the three wars of 1864, 1866, and 1870; and since then we know only too well, and the National Debt testifies, that the 'increasing aversion' referred to by Creasy, and which we of to-day unquestionably share, has not prevented men from using the 'irrational' instead of the 'rational' method of settling disputes.

At the present time we are about to discuss what 'disarmament' is practicable: but it is not suggested that all armaments can be abolished. It is of little use to maintain even small armaments unless one knows how to use them—since the mere fact of their maintenance implies that they may have to be used. Further, a knowledge of their use is necessary if reduction is to be made intelligently. Both of these reasons, no less than the widespread misconceptions we see daily, furnish ample justification for making some study of the several branches of warfare.

Sea warfare is one of the branches of warfare. Action at sea is not something distinct from, something unrelated to, the other activities of war. What the relation is, and the part sea warfare plays in the general struggle called 'War,' should be clearly appreciated.

The operations of the sea forces constitute a course of action to attain the object of the whole of the fighting forces, of which they are a part. The

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operations of the whole fighting forces are themselves a course of action to attain a national object—the object for which the nation went to war. What is that object? That object is to compel the enemy nation to compliance, to force them to accept a solution of some difference against their will. The national object can indeed be carried further back to the end expressed by Aristotle, Turpin de Crissé, or General Sherman—Peace; but for our immediate purpose that is not necessary, though in the conduct of war it is not an end that should be left out of sight. Hatreds generated by brutality are obstacles to peace.[1]

Compliance is compelled by the imposition of hardship. In the long run, that which obliges one nation to surrender claims which it considers vital to its national existence or security, is the hardship it will suffer if it does not surrender. Although surrender follows the defeat of the fighting forces, it is not the loss of so many tons of wood or steel called 'ships,' or so many hundred thousands, or even millions, of men out of the millions of the population that causes surrender, but the results that follow from their loss. For instance, in the First Dutch War, a number of battles disastrous to the Dutch fleet brought about surrender, not because those ships and men were lost, but because their loss rendered the Dutch unable to continue

[1] 'Ends differ; sometimes the action itself, without more, constitutes the end; sometimes there is something beyond, which is to be accomplished by the action, which is the thing sought, or ulterior object.'—T. Marshall, *Aristotle's Theory of Conduct*, p. 55.

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their trade by sea on which their national life depended. The battles of the Gabbard and the Texel made the English, in De Witt's words, 'Masters *both of us* and of the seas'—of '*us*,' the Dutch nation, whose life-blood was thereby stopped. They were not what Jomini called 'sterile battles'—battles fought for the sake of winning them; but battles of which the result was fruitful, conferring the power to inflict pressure on the enemy nation with whom we were at war.

Compliance, as that example shows, can be compelled by interruption of essential external lines of supply and distribution. The degree to which a nation is dependent on the external lines by sea is the measure of efficiency of sea warfare against that objective. Though I must speak with diffidence of land warfare, I suggest there is an analogy. The overthrow of the armies is usually followed by surrender, not because of the actual loss of men, but because the nation is thereby defenceless. The life of a nation is largely made up in the activities of production and distribution: loss of defence places the means of production and distribution in the hands of the enemy. To stave off occupation and its ills, the nation, when its armies are defeated, surrenders, in order to avoid the greater ills which occupation would entail. Ludendorff in October 1918 wished to continue fighting when he heard President Wilson's suggested terms. 'Could the terms be harder than they promise to be?' he asked. 'Oh, yes,' replied the Chancellor, 'they might invade Germany and lay waste the country.'

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Occupation did in fact follow, and we witnessed the subsequent seizure by the French of a centre of production, the Ruhr, with this aim of compelling compliance upon the people. Pressure would be brought upon the enemy people by such occupation : but it could not be brought until the enemy was disarmed by the overcome of his armies.

Thus we may say that an enemy people may be compelled to compliance by loss of the use or control of its internal and of its external communications.

The services of *internal* production and distribution are, in the main, vulnerable only to military or air attack : though that part of internal distribution which is conducted by coastwise traffic is exposed to sea attack—as it was in France in the Napoleonic wars, and, in a still more marked form, in the United States in the war of 1812. The external lines are by land and sea, over land frontiers and out of the seaports. So far as they run by land, they are vulnerable only by land or air attack. But inasmuch as a very large proportion of the trade of most countries is conducted by sea, and many necessaries can come only by sea, the stoppage of the sea communications constitutes a more serious hardship.

A country may redress its loss of sea-borne commerce by increased trade on land : Napoleonic France, for example, though almost completely invested by sea, had still the European markets open, and French foreign trade actually increased by some 50 per cent. between 1800 and 1806 ; but as European markets became restricted, the

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trade fell back to its original figure and did not recover. That this investment of France influenced her to a serious degree is not less clearly to be traced in her continual financial difficulties than in Napoleon's desperate efforts to bring the constriction to an end, culminating in his disastrous Russian adventure of 1812—a campaign resulting directly from the effects of the sea warfare.

One may make an analogy between the attempts to coerce a nation and those to coerce a fortress. A fortress may succumb to investment or assault; Paris and Kut fell to investment; Badajoz and Seringapatam to assault. A nation may succumb to investment or assault; Holland in 1654 and Spain in 1762—for the capture of Havana constituted investment—fell to investment; Austria in 1866 to assault.

When sea power and land power are joined together, as in the late war, compliance results from a combination of the results of investment and assault, investment weakening the power to resist assault, and assisting to cause that weakening of the so-called 'home front' to which some attribute the final collapse of Germany. Sea warfare may be waged to contribute to the efficiency of assault, furnishing the power to attack in theatres where the enemy is at a disadvantage—as it did in Spain in 1809; and in conferring freedom of movement to armies in purely land campaigns, as in the campaigns of Mehemet Ali, in Chile, and in almost innumerable other wars.

The doctrine of what is erroneously called the

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'capture of private property at sea' is more easily appreciated if sea warfare is thus examined in its strategical aspect. It cannot be too strongly insisted that it is not the capture of individual merchant ships, the property of, and carrying the property of, the individual citizens, that is aimed at. It is the stoppage of the enemy's flow of commerce. Capture, or the prospect of capture, is a means to an end—it forms the deterrent to sailing. Assuredly, it was not when our cruisers were making handsome hauls of prizes in the Soundings—generally to the detriment of the services of the fleet—that our sea warfare was making itself most felt. The mere fact that there were enemy vessels at sea to capture showed that commerce was continuing to sail. Sea warfare was becoming an influential economic factor when there were no enemy merchant vessels at sea to make prizes of—when the flow of commerce had stopped.

Loss of shipping can be avoided by the simple measure of keeping ships in harbour, but shipping that does not ply is mere useless wood or steel. Ships in harbour are not keeping up the flow of vital trade; they are but mere registers of its death, silent witnesses to the success of the enemy's investment. It is indeed questionable whether more injury was not done to trade by the stoppage of sailings caused by the *Emden* than by the actual losses of the ships and cargoes she captured or sank.

Sea warfare is not confined in its ultimate aims to investment—bear in mind that I am at this stage

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speaking solely in terms of *ultimate* aims and not of the course of action required to attain them, which is a different matter. It opens, as I said earlier, new channels for the assault, gives freedom and mobility to armies. Neither Maillebois nor Bonaparte would have undertaken their invasions of Italy by the Alpine passes or the Corniche Road if the sea had been open—as the Directory desired—for the transport of troops. But a detachment of the Mediterranean Fleet under Nelson closed that line of communication and co-operated with the Austrian army under Beaulieu. 'My Squadron,' said Nelson to one of Beaulieu's officers, 'had no other object whatever but the co-operation with his army.' And this he was able to do because his little detachment was covered by the battle fleet off Toulon under Sir John Jervis, which, keeping a close observation of the fifteen battleships in Toulon, neutralised their action. This digression from major to minor strategy is made to call attention to a vital principle which lies at the bottom of the so-called 'battleship question.' The mobility and the choice of objectives are possible only if the enemy's main force is strictly attended to. The enemy on this occasion had a main force of fifteen 'battleships' in Toulon. Sir John Jervis lay close to them, ready to engage them if they moved. Without that battleship cover Nelson's small detachment could not have given five minutes' assistance to the Austrian army.

The direction of effort in sea warfare may be illustrated in three wars—the Elizabethan, the

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Dutch War of 1654, and part of the War of the Spanish Succession.

In the first, in so far as any continuous policy was followed, naval warfare took the form of investment. Spain was dependent for her national life upon her trade with the Indies : the bullion brought from thence by her fleets was vital to her. Against these fleets—fleets of well-armed vessels—and the ports where they gathered or whence they sailed, the various expeditions of Drake and others were launched. If that trade in bullion could have been completely stopped Spain would in effect have been invested, investment being a deprivation of essential supplies.

But no regular or continuous measures to stop the trade were used. The investment was incomplete. The reasons were mainly political and psychological, and need not be examined here. The result of not breaking the communications was that Spain survived and was able to attempt her unsuccessful counterblow in the form of assault, the Armada. The greater flexibility of finance in modern times, and the increased possibilities afforded by credit, stave off such immediate disaster. They do, however, but postpone it : and though postponement may save a situation, it cannot be indefinitely prolonged, as we ourselves found in 1917.

But that the Elizabethans, such as Monson, were justified in their view about the cutting of the sea communications of Spain with her sources of power in the western world, was shown by the result of Blake's action at Santa Cruz. Cromwell and Blake,

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true Elizabethans each in spirit, than whom no one was more thoroughly imbued with the spirit of striking at the enemy's armed force, fully recognised where Spain's heel of Achilles was to be found. When the opportunity arose, Blake's fleet arrested the passage of the bullion at Santa Cruz. The results reached far beyond the harbour in Tenerife. Spain's finances were crippled ; her military operations were thereby stopped. Unable to pay her armies, the invasion of Portugal came to a standstill, and Portugal was saved on the brink of disaster. Spanish power in Europe was struck at its very roots, and Marvell's lyrical celebration of the victory expressed a strategical truth when he sang

> Oh would those treasures which both Indies have
> Were buried in as large and deep a grave ;
> War's chief support with them would buried be,
> And the land owe her peace unto the sea.

In the war with the United Provinces, on the other hand, complete investment was attained as a result of the destruction of their fighting forces and the peculiar and unfavourable position of Holland. Even more dependent on her sea-borne commerce than Spain, she succumbed when it was stopped. It is sometimes said that a navy cannot win a war by itself. The statement is generally true, but, as this war shows, is not of absolute application. Nor need we seek evidence farther back than 1917 for a similar exception.

The War of the Spanish Succession shows a different orientation of the sea warfare in major

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strategy. Different conditions called for different use of the national forces. France was the enemy, we were not single-handed, and she was not dependent on sea trade as Spain and Holland had been. Moreover, the object was different. The aim of the Grand Alliance was to prevent France obtaining the hegemony of Europe. Her armies had to be driven out of Flanders and Spain. This end could be obtained only by military action, and the principal object of the naval forces of the Alliance was to assist the armies in that task. The assistance they could give was great. Stationed in the Mediterranean, the fleet controlled the sea lines of passage between France, Catalonia, Naples, and Genoa : enemy troops could not move except by land. It could afford invaluable support to the troops of Savoy and Austria, who, moving into France in this part, could provide an influential diversion for the armies in the great theatre in the North : and, on the economic side, the mere fact of the fleet's presence in those waters, and the station which, in order to fulfil those military demands, it occupied, stopped the supply of resources of the greatest military and economic importance. Marlborough's proposal for 1707 was one of progressive steps in co-ordination. The first military blow aimed at the destruction of the enemy fleet and arsenal at Toulon. The use of the sea was of such importance that this would bring about a diversion of troops from the army in the Netherlands. If it should succeed—as it came near to doing—and the French fleet should be

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destroyed, use of the absolute command so obtained would be made greatly to increase both military and economic pressure. This I look upon as one of the masterpieces of combined strategy. The scheme proceeds progressively from objective to objective, the two services concentrating their combined efforts upon one thing at a time in its proper order. Toulon did not fall ; but the failure did not lie with Marlborough but with others, who, unlike fleet and army, failed to put into practice that first principle of war—concentration of effort upon a single object.

While military victory was thus the predominant aim, steps to weaken the enemy by investment were not neglected. By 1709, besides the effects of the military blows of the preceding year at Oudenarde, Lille, Italy, and Port Mahon, France was suffering greatly from the effects of the operations at sea. Her finances were crippled, and she could neither buy nor, if she could buy, import, the food she needed. Aggravated by a failure in the harvest, her distress was so great that the great Duke even considered whether further military operations would be necessary, and if it would not be sufficient to complete the process of exhaustion by sea warfare alone. The food supplies from the African coast were intercepted : orders were drafted that all Genoese ships exporting corn to France were to be intercepted : while the Dutch and English forces scoured both the Baltic and the Mediterranean. And this disposition of force was possible only because the French main sea-fighting

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forces were rendered unable to interfere by the British battle fleet.

The three examples of sea warfare thus roughly sketched are of wars in which victory—or peace—was to be obtained only by bringing pressure on the enemy nation as a whole. But this is not the only form of war. When the possession of territory beyond the frontiers is in dispute there is no need to invest or assault the mother kingdom. Thus, when the United States in 1890 wished to change the government of Cuba they were not obliged to attack either the external or the internal communications of Spain or to attempt to destroy the army in Spain. To drive the Spanish troops out of Cuba was enough. So, too, when Italy desired to obtain Cyrenaica, it was not necessary for her to bring economic pressure upon, or to invade—in other words, to invest or to assault—Turkey. Defeat of the fighting forces in the disputed area, and occupation of the country, gave her what she needed. Japan in her struggle for Korea, Britain in hers for Canada, were in a similar position. Neither the Russian nor the French peoples were subjected to pressure nor the main Russian or French armies destroyed. They were rendered unable to regain possession of their territories.

In wars of this character, with a limited object, the same general proposition as to the two measures holds good. The object is attainable *directly* by investment or assault. But the enemy's fighting forces in the area concerned are not only the

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immediate, but also the final objective of the national effort. The national life of the people is not, as in wars of the other character, an objective. The captures of Cuba, Canada, Korea, or Cyrenaica were completed by the defeat of the enemy's armies in those territories—that is, by assault. On the other hand, Korea, when invaded by Hideyoshi in 1592, was saved by investment of the Japanese army, the Korean navy cutting off its communications and investing it, forcing it thereby to evacuate the country. Destruction of the Japanese fleet in the Russo-Japanese war would similarly have compelled the surrender of the Japanese army. All of which can, of course, be said shortly in a few words. An army is dependent on its communications, and when those communications are by sea, their severance is fatal. It surrenders to investment.

In these wars the main conflict was confined, as it were, within a ring, held by the fleet of the superior sea power. The *ultimate* object of the sea warfare was to enable the army to destroy the opposing army. The *immediate* object, or if you should choose, as you may, so to call it, the course of action for attaining the ultimate object, was to disable the enemy's naval force—using the word 'dis-able' in its widest sense of rendering it unable to oppose: and to that object attention must be exclusively directed. Short cuts to victory, attempts aimed at the final objective, have an almost unbroken record of failure. The doctrine of victory by evasion, direct attack upon the people's life without overcoming their armed forces, can find no support in

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the experience of war. It is a theory only, yet to be proved.

The direct efforts of the operations in sea warfare are thus properly concentrated upon the disablement of the opposing navy. The result of the efforts, if successful, is Command. Command enables armies to be moved and assisted : and command may, but does not necessarily, automatically result in appreciable economic pressure on the enemy. Whether it does or does not, and the degree to which it operates, depend upon the extent to which external supplies are essential, and upon the position which circumstances oblige the covering force to take up. In the case of Great Britain, when at war with France, Holland, or Spain, the covering force had necessarily to be in touch with the enemy at his point of departure—the home base—for besides covering the expeditionary force it had to guard against the counter-blows, always attempted, of invasion and trade attack. In that position it acted in prevention of trade. Some thirty per cent. of French foreign trade, for example, was with their West Indian Colonies, of which a large proportion entered the western ports—and so, automatically, economic pressure resulted from the fleet occupying the commercial approaches which corresponded with the military exits.

But a covering force need not necessarily be off the points of departure, and it may exercise but little economic influence. The American squadrons, for example, in the war with Spain in 1898, produced no great economic pressure, except in so far as the

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stoppage of the Cuban trade was concerned. There was no need for the American ships to cross the Atlantic. Their covering forces were localised in the West Indies, off Cuba itself, where the objective —the Spanish garrison—was to be found. Unlike Britain, the United States had no interests in the East Atlantic to cover—a kingdom to defend from invasion or investment—which could only be done from a station in close touch with the main enemy fleet. If such Spanish forces as remained in Europe were to be used to influence the course of events in Cuba, to Cuba they must come. And there the American forces would receive and fight them.

The Japanese, in a similar way, confined the sea warfare to the Eastern seas. No attempt was made to deal with the Russian naval forces in Europe until they should arrive in the East. Admiral Togo met them in his home waters, with what, quoting a Chinese writer on war, he called ' the advantages of the situation '—that is, close to his own sources of supply. He was able to do so because no interests were thereby uncovered and he had the certainty of being able to meet them there—the same reason, *certainty*, which caused Lord Howard of Effingham to advocate the exactly opposite course of seeking the Spanish fleet in its home waters, as there was a risk of missing them if they came to the Channel.

Thus, economic pressure may take place though the object is purely concerned with assault ; but it will vary according to circumstances.

This form of pressure is, however, both slow-acting and liable to produce untoward results for

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its user. Many factors affect it, of which the most influential are neutral rights. The greater the effort made to restrict supply, to make investment complete, the more are neutral interests affected and the greater become the possibilities of adding to one's enemies. The power aiming at reduction by investment is invariably exposed to neutral resentment to a degree which does not obtain on land, although the occupation of a country produces precisely the same restrictions to trade. The risk of neutral intervention is, therefore, always present. It may lead to active armed intervention, as it did in the case of the Armed Neutralities of 1780 and 1800. It may lead to such action as Mr. Page feared might be taken by the United States in the late war—refusal to supply munitions and supplies essential for the conduct of the war. The attempt of Germany to make investment complete by means of submarine operations against all mercantile vessels without discrimination brought the United States into the ranks of her enemies. It is not my purpose to discuss International Law, nor what are 'rights' or the different interpretations of them. It is enough to point out the fact that unrestrained use of the power of command at sea may defeat the very object of the operations; and instead of weakening the enemy, strengthen him. In 1780 the stoppage of contraband was considered so essential, that the Government of the day preferred the addition of Holland to our enemies to allowing France to receive those supplies. It is proper to say that this did not pass without severe criticism. In the late war

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we walked like Agag : and it is not unworthy of notice that those Powers who profess most strongly the sacrosanct character of what is improperly called ' private property ' when they are neutrals, when they are allied to a naval Power which possesses ability to invest not infrequently prove *plus Royalistes que le Roi*.

To form plans for war, and particularly (because the opportunity is greater) in sea warfare, which exclude consideration of the neutral, is the height of folly. The German did it on land and sea. His violations of neutral rights were the direct causes of adding Great Britain, Italy, and the United States to his list of enemies. And in this connection I would point out—though it may be a digression—that there is already a tendency to forget this lesson. We hear of air-bombing and poison-gas attacks upon civil populations. It is true that neutrals, for a long time, took no active steps to prevent the murder of their nationals at sea, but in the end the most powerful neutral intervened. Similarly, neutrals may, and should, have something to say if their people in foreign cities, and particularly their diplomatic and official representatives, are the victims of poison-gas bombs dropped in the neighbourhood of, say, the Albert Gate or the Via Vente Settembre. Moreover, such action leads invariably to retaliatory action, and the retaliatory power possessed by a fleet is very considerable in certain circumstances. Once retaliation is provoked, and begun, the Aristotelian object of war—a good peace—becomes unlikely of fulfilment.

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The longer a war lasts the greater become the opportunities for friction. Contraband lists, under the influence of invention and the application to purposes of war of materials not hitherto included, expand; and every expansion tends to produce protests from those whose commercial activities are correspondingly contracted. Since a decision at sea establishes definitely the command, enables measures of blockade recognised by all Powers to be enforced, expands the power of assault, and tends to remove the temptation that a balanced situation offers for intervention, it is most desirable not only that no opportunity of a measure for weakening the forces should be missed, but that a decision of strategic influence should be obtained as early as possible. How long a war of which 'investment' is the characteristic strategy might last is shown by the power of this complex manufacturing country of ours, dependent for its life on its external communications, to support a reduction of its imports. In December 1917 British imports had been reduced from some thirty-six million tons, excluding foodstuffs, to some eight million tons, excluding foodstuffs and munitions.[1] How much more immune from this form of pressure must be a country so situated as to be able to conduct a large proportion of its trade by other channels than those direct to her seaports. Investment is, in fact, an auxiliary of the highest value; indeed the 'alliance-value' of Britain is largely due to it, as every war has shown. It is to be attained only, as every result of war is to be

[1] Salter, *Allied Shipping Control*, p. 289.

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attained, by disablement of the enemy's fighting forces. If fighting is indecisive, investment will be either incomplete or inappreciable, as it was in the War of the American Revolution, throughout which French trade with the West Indies continued under convoy with little or unimportant reduction. When battle has destroyed the means of protection, as Anson's and Hawke's victories did in 1747, it becomes rigorous, and an effective contribution to the process of compelling the enemy to compliance. The grinding effects of sea warfare are too frequently lost sight of in the more dramatic campaigns on land, and the history of wars tends to become distorted thereby.

It is, however, one thing to say a decision is required, but another to bring it about ; and therein lies a fundamental difference between land and sea warfare. An army has the power of attacking, with its own resources, the position held by another army—a Plevna or a Hindenburg line. A navy cannot. If an enemy navy, desiring, owing to weakness or any other cause, not to fight, takes post in harbour, no fleet without another arm can destroy it materially—though it may destroy it morally—except when, as at Santa Cruz or Tenerife when Blake attacked them, or Algiers in Exmouth's fight, the defences are of less even than a second-class order. If a quick decision is required it can only be brought about by combined action. Batteries on shore have always been the masters of ships' batteries. 'Un canon à terre vaut un vaisseau à mer,' says a French proverb ; and the English and

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American sayings on the matter express the same intention though they give a different proportion. Changes in material have made no difference, though technicians have imagined they have done so. The relation between ships and forts that was true at Cartagena, Chatham, Brest, Cadiz, Vigo, Ferrol, and Cronstadt in the seventeenth, eighteenth, and nineteenth centuries is equally true in the twentieth, whatever technical enthusiasts may imagine. It may seem unnecessary to refer to so obvious an axiom, which was a commonplace to every serving officer in the old wars, were it not for the fact that in almost every war it is forgotten. A fleet in the eighteenth century is ordered by the Privy Council to force its way into Ferrol and destroy a Spanish fleet ; in the nineteenth century a clamour is raised because the Baltic Fleet does not attack Bomarsund and Cronstadt ; in the twentieth a fleet is sent to attack the Dardanelles. 'If Sir Robert Peel,' wrote Captain Sulivan from Bomarsund, 'had studied the naval history of the French war he would have learnt that Nelson never attacked a battery with ships, except very slightly on the first day at Tenerife, when, thinking it impossible to succeed, he gave it up and tried to carry the place by storm.'

Since the desirability of an early decision at sea has always been obvious to our predecessors, command at sea (and it cannot too frequently be repeated) being the first requirement of Britain in any war, and since our enemies have so frequently adopted a Fabian strategy of defence, it is natural that either plans should have been put forward, or

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attempts actually made, to reach the enemy fleet in its harbours. Thus in 1694 a combined expedition is sent against Brest, which fails terribly in Camaret Bay from worse than mere want of secrecy. Marlborough's plan of campaign of 1707 is informed with the same idea. In 1741 Admiral Norris puts forward a proposal to land the expeditionary force to destroy the Spanish fleet in Ferrol. In 1758 Wolfe supports a scheme for a combined attack upon the Isle of Aix because it will force the enemy fleet to sea and 'inevitably brings on a sea fight which we ought by all means to aim at.' In 1799 a proposal is considered for sending an army to Brittany to destroy the French fleet in Brest. The expedition to the Helder had the destruction of the Dutch fleet as one—the only rational one—of its objects. The weak attempts on Ferrol and Cadiz mark the same idea. In modern times we have the monumental destruction of the Russian fleet in Port Arthur by the Japanese army.

The question not unnaturally arises: 'On how many occasions were attempts made thus summarily to destroy an enemy's fleet: if and when made, how often were they successful?' Of those quoted—the list is not exhaustive—the Helder and Port Arthur alone were successful; of the others, some were proposed and rejected and some failed in their execution. Brest was not attempted in 1799 because we had not the troops available. Ferrol and Cadiz were looked at, but half-heartedly; for there was no Wolfe to carry them through. Whether, however, an attempt be practicable is clearly a

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matter that cannot be decided by one service. Combined study of the problem is needed, and we find ourselves, as we must always find ourselves when we think with any precision, brought back once more to the fact that land and sea warfare are not separate things, and that plans for war cannot be germinated in the womb of any one department.

If, upon examination, assault by joint land, sea, and air force appear impossible—as the foregoing experience shows that it may—other means of injuring the fleet are naturally sought for. While none may offer such prospects of decisive effects, others may promise to procure an effective weakening, perhaps material disablement, which will lead in turn to moral disablement of the main body of the enemy. In the past the fireship was one; Lord Cochrane's attack on Aix roads is the best known example of many. The invention of the torpedo opened up a new possibility. Torpedoes were powerful instruments which could be carried in small and very fast craft, difficult to hit at night, which possessed the advantage of apparent cheapness. Some successful or partially successful torpedo attacks have been made—the sinking of the *Blanco Encalada*; the Japanese attacks at Wei-hai-wei and off Port Arthur; and in more recent times, when a still smaller vessel, the 'coastal motor boat,' offering a diminutive target, came into existence, we get the Italian attacks on the Austrians in their harbour and on their squadron at sea, and the British at Cronstadt. Submarines have made attempts, but the qualities that render submarines effective are

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of little assistance in forcing the defences of harbours, particularly of those of which the navigation is difficult. Aircraft, which in reality are merely torpedo craft which move above the surface of the water, will undoubtedly play a part in the future; but those who know how poor is the material record of the torpedo as a weapon, and who recollect that to every one of these forms of attack an antidote has been invented, will not allow their hearts to run away with their heads in the belief that a new and supposedly inexpensive weapon has rendered the existing ones obsolete. The air torpedo craft, however, inherit the moral effect that the surface and the submarine torpedo craft have exercised. They will unquestionably have their successes, provided their operations are planned and conducted in co-operation with the other naval units: and their influence on war at sea is likely to be as far reaching as the introduction of any other new form of fighting vessel has always been. The study of the action of that part of the navy which flies is of the highest importance; but it must be conducted on the principle of co-operation of arms.

Thus it is not improbable that, as before, the enemy fleet in its harbours will be secure against destruction, and that such damage as can be done —for some will undoubtedly be done—to it will not be decisive. The main body of fighting ships will, in that case, continue to constitute a latent danger. Convoys of troops or trade will be in danger from attack by it. The capital ship, so much derided by those who fail to appreciate its

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true significance and function, and measure its value by the illusive standard of the number of 'battles' it fights, forms a constant threat to the trade and the detachments employed at sea: and what that is, anyone who has had the practical experience of escorting the Scandinavian convoys during the late war well knows. Let me illustrate this in a few words. Let it be supposed that those who consider the battleship a useless encumbrance and 'no use during the war' had been so far-seeing as to procure its abolition before the war; and that, following victory on land (which, in the absence of the British main fleet, without whose sanction the Expeditionary Force could never have reached France, would have undoubtedly occurred), the German battle fleet had been established at Brest. Would the convoys of our vital imports and exports, escorted by cruisers, destroyers, aircraft, or trawlers, have been able to come up Channel? Scarcely a shipload of commerce would have reached London, and the city's population could by no possibility whatever have been fed. Similarly, if the Austrian battle fleet had been free to come to sea, traffic in the Mediterranean would have ceased. Malta might well have been starved into surrender: for I do not know by what means its supplies of provisions could have been replenished. This country would in fact have collapsed within a few days. It should seem unnecessary to point out things so obvious were it not that there are still those who believe the battle fleet 'did nothing' because it was not constantly fighting battles: and who imagine that

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the new weapons can take the place of ships : or, in other words, that evasion can take the place of fighting.

If, therefore, no means can be devised to destroy, materially, the enemy who adopts the strategy of the ' Sally Fleet ' in his defended ports, he must be prevented from being able to do any harm if he does sally. The fleet is ' blockaded.' Though called ' blockade,' the intention is not to confine him to harbour—except in certain particular circumstances, such as one phase of the passage of the Japanese army to Korea—but to bring him to action if he comes out. The requirements of this measure are that the fleet shall occupy permanently a position in which it can maintain superior force which shall be capable of intercepting and bringing to action, under circumstances favourable to victory, the enemy fleet before it can put into operation any attempt it may desire to make. ' If I cannot get at you in your harbours, I will aim at doing so without fail if you put to sea.'

The fleet, in fact, takes up a covering position. But this strategy has a disadvantage of which seamen are well aware, for they have had ample experience of it in all wars. The enemy fleet enforces upon its opponent a disproportionate expenditure of force, to the detriment of his power to take offensive action and to defend his trade. The enemy fleet, in fact, forms a very powerful containing force.[1]

[1] The word 'contain' is used often, with great looseness, to refer to a blockading fleet, which is said to 'contain' the enemy. This use is militarily incorrect.

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For in order that a force of battleships of at least equivalent strength shall be permanently ready, there must be a margin for relief, since ships must absent themselves for docking and repairs. And this margin reaches a respectable figure. In the old blockades off Brest it touched twenty-five per cent. at times ; and the further the base of repair and the smaller its capacities for repair, the higher it must be. A fleet, moreover, is not merely composed of battleships. It includes cruisers and torpedo craft (using, as I always use, the words 'torpedo craft' in their proper significance of all craft whose principal weapon is the torpedo, whether they act on, above, or below the surface of the water). All these, too, are contained, and hence in part arises that shortage of cruising craft which has been the complaint of every admiral in every war : yet which in peace we so consistently ignore that every war finds us short of the number of 'cruisers' we need. Those cruising craft are needed to deal with the sporadic warfare by means of which our enemies have constantly tried to weaken our financial strength, to force us to dissipate our efforts, and to procure concentration on their own.

If then, unable to destroy the enemy by assault, a navy is obliged to fall back on this undesirable alternative of so-called 'blockade,' our powers of commerce protection are diminished. In the late war the Allies lost about 10¾ millions of tons of shipping, and it is within the recollection of everyone how near we came to collapse largely owing to shortage of shipping to carry, import, and export

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our trade and troops because we could not sufficiently defend it. There can be no question whatever that if we had been able to increase the security of trade by the employment of more cruising vessels, in particular of the lesser types, much of this loss would not have been incurred. This is shown by the very fact of the diminution in losses when the convoy system was in full swing. The convoy system required an ample supply of vessels of the smaller classes, and until they were available in sufficient numbers, that method of escorting vessels of defence could not be effectively used. Every cruising vessel 'contained' by the enemy's fleet was a vessel withdrawn from the protection of this trade, on the continuance of which the fate of the Entente depended. This containing effect was noted with legitimate satisfaction by Prince Bülow. 'Our battle fleet,' he wrote,[1] 'forces the main strength of the British Navy to remain in the North Sea and thus prevents England from using her full strength at the Straits, in which submarine warfare has assumed overwhelming proportions.'

Blockade, besides injuring the *moral* of a fleet, may weaken it materially. Even though it remain in harbour it requires supplies ; and if the supplies come by sea, as many of them must, their interception becomes possible. In the long struggle with France an incessant and pertinacious small-craft campaign was conducted inshore, with the definite object of depriving the fleet in Brest of the stores it needed : and with such success that as a base for

[1] Von Bülow, *Imperial Germany*, p. 37.

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large squadrons Brest became useless. The inshore operations of the Japanese off the coast of China produced a similar material disablement of the Russian squadron.

It is not to be supposed that either successful assault or 'blockade' will make a clean sweep of the enemy from the face of the sea. However close the observation, and however early it may be put into force, some enemy ships will get into blue water. The measures for dealing with those will be referred to later. The means necessary to enable the fleet to establish itself in and maintain its place of observation are next for consideration.

The first things a fleet requires are a harbour, within the principal naval theatre of war, wherein it can lie with security, and means, within as short a distance as possible, for repairs and storage. In short, a base of operations and a base of refit. The establishment of bases is a factor in grand strategy.

Bases have developed according to our needs. Deptford, Portsmouth, Woolwich, Gillingham Reach, Chatham, Devonport, Rosyth, Cork—to take some of the bases within the kingdom—arose according to the enemies of the time and the form of strategy employed. Devonport, for example, is usually connected with the strategy of close observation of Brest. Abroad, on every station where British interests called for defence, bases to supply their needs grew—Royal Naval bases in the West Indies at Antigua and Jamaica; a base for the East India Company's navy, used also by the Royal Navy, at Bombay.

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Until late in the seventeenth century the country was without a Mediterranean base : for until our interests in that sea required the presence of a fleet no base was needed. No sooner, however, in Cromwell's time, did it become necessary for a British fleet to procure respect for the interests of the pariah British Republic than the need for a base in those seas was felt. Examination was made by Cromwell's sea officers at Gibraltar, Buzema, and Tetuan. None were then acquired, but the need was not lost sight of. Five years later it was fulfilled when Tangier came into our hands, only to be thrown away, for reasons we need not examine beyond saying that they had no connection with sea warfare or strategy, after twenty-two years of experience had shown its value. Pepys shows himself well aware of the need : in his naval minutes he says 'That in case of a war with France we shall be driven wholly to give over trade; they will be able so to infest us with privateers near home, and command all in the Straits, *forasmuch as having no ports of our own there*, it will be impossible for us to bear the charge of maintaining fleets there to answer the force of France in that sea at their own ports.' [1]

The next war in Mediterranean waters, therefore, found us once more without a base, but with the use of Cadiz, such as it was. The value of a base, as I remarked earlier, is measured in part by its distance from the objective, in part by the facilities it offers. Cadiz was far from the stations of the enemy fleets within the Mediterranean. How

[1] *Samuel Pepys's Naval Minutes*, N.R.S., vol. lx. p. 37.

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much a base nearer the enemy was needed was clear, and the capture in 1704 of Gibraltar, valuable as it was, partially, but partially only, supplied the need. It then had no repairing facilities and it was a long way from Toulon. The great land and sea campaign in Provence, to which reference has already been made, showed clearly that it was not possible to exert our whole strength unless the fleet could be maintained permanently in the Mediterranean in a suitable position. Both maintenance and position could be afforded by Port Mahon in Minorca, and Marlborough's unerring eye fell upon it, and he writes in 1708 : 'I am so entirely convinced that nothing can be done without the fleet that I conjure you if possible to take Port Mahone.' So Mahon was taken, and with Mahon and Gibraltar the fleet could act with terrible effectiveness. 'With this conquest (Mahon) and Gibraltar [wrote Saint-Simon] the English found themselves in a position to dominate the Mediterranean, to pass the winter there with their entire fleet, and to blockade all the ports of Spain in that sea.' Admiral Sir John Norris, writing in 1740, said of Mahon that 'if once lost we could never retrieve [it] and without it in a French war there is no port where we could support a superior fleet against France and Spain, and must in war be the loss of all our Mediterranean trade.' [1]

Mahon was eventually replaced by Malta, and Malta and Gibraltar thereafter furnished the maintenance bases. Operation bases came into existence

[1] Diary of Sir John Norris, Jan. 24, 1740. B.M. Add. MS. 28132.

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according to circumstances—Hyères, Villefranche, Maddalena, Palermo, Mudros, and a host of others well known to the small craft officers in the last war.

Turning to the Eastern seas, while Bombay was long our base in the Indian Ocean, its distance from the principal theatres of military operations in the struggle with France was a great disadvantage. Victory in the great campaigns on the Coromandel Coast in the Northern Sirkars and Bengal depended upon command of the sea, and the naval head-quarters, Madras, could not be used for three months of the year. The operations at sea bore the same relation to those on land as the foundations of a house do to the rest of its structure. As a battle squadron supports cruiser forces and enables them to exercise control, the fleet in those Eastern campaigns enabled the armies in India to exercise control. In its absence, enemy troops could be introduced, sufficient to turn the scale against the British forces. Owing to the distance of Bombay from Coromandel enemy fleets more than once arrived on the coast before the British, and command passed into the hands of the enemy. A harbour secure from the north-east monsoon was badly needed. No sooner, therefore, did Holland intervene, in 1780, in our struggle with France, than Admiral Hughes put forward proposals for the capture of Trincomali, the only harbour in which ships could ride through the north-east monsoon ; and it was taken by the seamen and marines of the East Indies squadron, with a labour force of 500 sepoys from Madras. Failure to recognise the importance of the

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base led to its loss. The Select Committee of the Madras Council ceased to supply an adequate garrison, and, during a temporary loss of sea command, it fell to an attack of Admiral Suffren: and thereby our position in India was more gravely imperilled than it ever had been before, or has since been. Trincomali was retaken in the next war, and developed as a strong base. Standing as it does at practically the focus of the steamship routes of the Indian Ocean, it is admirably situated for the purposes of the squadron engaged in the defence of trade. By itself, however, Trincomali could not supply the strategic needs of so widespread an area as the Indian Ocean, and the squadron in those parts was divided, in 1863, into two divisions, the Western based on Bombay, the Eastern on Trincomali and Singapore. The cession of Hong Kong in 1860 gave a much needed base for the squadron in the China Seas. It is a far cry from the little yard at Deptford which served the needs of the Royal fleet of the sixteenth century and earlier, when the King's ships were based at the Tower of London, to Hong Kong or Singapore in the Eastern seas; yet the process has been one of logical development throughout.

Thus, sketched in only the very broadest outline, it is possible to see how, with our spreading interests, bases to enable the navy to protect them have necessarily been developed. Two hundred years of development can be traced. Ideal positions fulfilling the needs spoken of earlier have not always been procurable and repair facilities have sometimes

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had to be so distant from the zone of operations as to prejudice command. The scale upon which the bases have been furnished depends directly upon the foreign naval forces in the area concerned. Where nothing but cruisers are maintained, a base for cruisers suffices : where ships more powerful than cruisers are maintained—as, for example, when Russia had a battle squadron in the China Seas—the base must be capable of maintaining ships capable of meeting them, otherwise the cruisers will not have the cover without which, as I have tried earlier to show, they cannot fulfil their functions.

Summarising what I have tried to say, my remarks amount to this :

Warfare is a process of compelling compliance on an enemy people. The fighting services are the instruments used to achieve that common object. The object being common, the efforts must be co-ordinated. Sea warfare is thus a part of the whole, not to be considered as a separate and unconnected matter.

An enemy can be compelled to compliance by investment or assault. Sea warfare is capable of conferring the power of investment and of contributing to assault the power of mobility. Neither investment nor mobility can be complete so long as there exists an effective body in a condition to oppose movements. The first business in sea warfare is, therefore, to disable that body. The most complete disablement is material destruction : but paradoxically the greater the superiority at sea, the less becomes the capacity materially to destroy,

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since the enemy shelters himself where the naval forces alone cannot destroy him. But he may be destroyed by combined effort. If combined effort is impossible, the superior force falls back upon attempts to weaken : and upon preventing the inferior from hampering his actions of investment and movements at sea. To do this, he masses his naval forces in positions close to those where the enemy has taken shelter. He needs means to maintain them in those possessions : and of those means the first is, a place where he can lie—a base. Thus to enable the fleet to act it must have bases ; and those bases arise in those areas in which there is a need to defend British interests.

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SEA WARFARE

II

BY VICE-ADMIRAL SIR H. W. RICHMOND

My last paper dealt with the ultimate objects in sea warfare, the broad governing principles of the use of naval force, and the conditions essential to the exercise of sea power. Concentration of effort was shown to be as primary a condition of success as it is in every other human activity. The primary objective of the fighting forces is, therefore, the principal concentration of enemy force, of whatever type or types of vessels that concentration may consist. Finally, the concentrated force needs the means to maintain itself in contact with the enemy; that is, a base: without which no force, however strong, can exercise continuous control. Those are the foundations of all the operations of sea warfare: and to attempt to build without them is building upon sand.

Pressure can be brought to bear, as we have seen, on an enemy people by stoppage of sea-borne commerce. There are, broadly speaking, two methods by which commerce can be interrupted (though 'methods' is not a strictly correct term

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to use)—'blockade' and 'sporadic warfare.'[1] The term 'blockade' is also admittedly inaccurate, but it is one for which at present we have no satisfactory alternative. It is necessary to recognise this differentiation, as mistaken conclusions arising from confusion between the two are drawn as to the influence of what is called 'war upon trade.' It is argued that trade at sea should be free in war: and the syllogism upon which this opinion is founded runs thus: (1) The 'guerre-de-course' has never succeeded in bringing about a decisive result in war. (2) The 'guerre-de-course' is the measure by which trade is attacked in war. (3) Therefore attack upon trade has never produced a decisive result in war.

The first premiss is correct; the second is incorrect, and consequently the conclusion is wrong. Sporadic warfare is not THE *measure* by which trade is attacked, but *one of the measures*. I shall refer later to its influence.

A power superior at sea, and possessing the means of exercising its superiority—bases—can station its forces on the enemy's threshold, or in positions from whence they can control the approaches. This brings commerce to a standstill, and this we call 'blockade.' Such blockades as those in former wars off the coast of France or the Southern States of America are not practicable to-day, on account of changes of material; but the control can be exercised in another form. It is still the method which a power superior at sea will desire to use if

[1] Called otherwise the '*guerre-de-course*.'

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investment is to form one of the offensive measures in a war. Do not let me convey the impression that 'blockade' or 'extension of contraband,' or whatever term is used, is easy to apply effectively simply because of superiority at sea. It is not. The late Lord Loreburn, a strong opponent of capture at sea, put forward weighty and reasoned opinions against it, and although the late war gave practical evidence that pressure could be effectively applied in the circumstances of that war, many of the limitations which Lord Loreburn urged are still operative. Nelson himself, an officer with a very remarkable knowledge of matters concerning trade, said 'We English have to regret that we cannot always decide the fate of Empires on the sea' (note that characteristic qualification in the use of the word 'always') —and what he said is true to-day. But when land frontiers are blocked by the armies of allies, as were those of Germany, and when difficulties exist or are placed in the way of importing or exporting through neutral ports, so many leaks are stopped that a situation amounting to one of blockade exists. Only a power superior at sea can produce this situation.

An inferior sea power, on the other hand, believing itself unable to overcome the enemy's fighting forces, if it wishes to weaken the enemy by interruption of its sea-borne supplies can only operate against them by sporadic warfare. Too weak to lie in, or close to, the main avenues of approach where the enemy is strong, he must seek his quarry further afield, on the separated

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instead of the concentrated trade routes. Blockade strikes at the root, sporadic warfare at the branches. The latter is effective only if it makes captures so numerous as to reduce the flow of commerce below the amount necessary to maintain the enemy nation. The stronger sea power has no need to use this method ; indeed, it has good reason not to do so, since it involves a dispersion of force when what is needed is concentration against the enemy's fighting forces. Dissipation conflicts with the fundamental principle of concentration of effort and force. But the weaker sea power, which, however much it may concentrate, is still unable to establish superiority, is inclined to turn to sporadic warfare. Although in all the wars of which we have authoritative record serious injury has been done by this form of warfare, no navy up to the present which has made it the principal feature of its sea warfare has succeeded in crippling commerce to the degree with which 'blockade' has crippled it. Losses have been inflicted to so grave an extent as seriously to prejudice the superior power's capacity to continue war ; the 'guerre-de-course' after 1805 and the submarine operations of the last war are cases in point. Nevertheless, in both cases it proved possible, by the adoption of measures in conformity with the principle of concentration of effort, to defeat the campaigns.

This form of warfare has results beyond the actual losses of shipping, and it may be conducted with the definite aim of those results. Enemy vessels scattered over the ocean operating against trade infallibly produce diversion of force : and in plans

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for such warfare in the past it is not uncommon to discover one aim of the attack upon commerce by squadrons and ships in open waters to be to effect a dispersion of British force which shall result in such a weakening of the concentration as to open the way for the counter-blow of invasion.

How great is the diversion produced by even a small number of vessels is shown by endless examples past and present. Two German light cruisers at large in the Indian Ocean were responsible for the diversion of not less than a score of similar vessels in search of them ; Von Spee's squadron when at large, unaccounted for, affected the disposition of some five times their number : and the very small number of submarines operating at any moment in the Channel used up the services of a vast number of vessels of the small class of cruisers which we call destroyers and sloops. Astonished as many people were at these heavy demands, there was nothing either new or peculiar in them. In the old wars the privateers from St. Malo, Cherbourg, Le Havre, Boulogne, Roscoff, and the many French Channel ports forced upon the British the employment of over 1500 small craft to defend the trade in home waters.

There are those who consider that, since Great Britain is a great commercial nation, and since the defence of her trade calls for so great an expenditure of force and money to maintain it, it would be to her interest to abandon ' trade attack '—provided others would do the same. It is true that thereby we should be furnished with a shield. But a

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sword would be taken away, as Lord Salisbury pointed out in commenting upon the weakening of British power which resulted from the Declaration of Paris.[1] That power, which, as the history of all our great wars past and last plainly shows, has been the basis of an alliance value, has contributed materially towards compelling compliance upon an enemy, and without which, so far as it is possible to judge, the Entente could not have been victorious in the late war, would be gone. The power of investment would be removed, or its effects confined to purely military areas ; which no one with experience will consider practicable in the present state of land communications. To abolish the power of investment by sea, while leaving it untouched on land, is the negation of logic. Moreover, to take from a maritime power the right to exercise pressure in this manner leaves her with no offensive weapon except the only alternative measure of enforcing pressure—assault. Assault calls for military forces ; and unless this country is to depart from the policy which has carried it successfully through three centuries it must either become a military nation or make war, as no one has ever yet made it, by defensive measures alone. It is, of course, true that in many wars, the lesser ones in which both the object and the scope were limited, military operations have decided the issue and military force the predominant factor—such wars as those with lesser or

[1] 'I believe that since the Declaration of Paris, the fleet, valuable as it is for preventing an invasion of these shores, is almost valueless for any other purpose.'—*Hansard*, 6 March, 1871.

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savage powers. But it is the wars of coalitions which have decided the fate of the world and of the Empire, the wars with the great perturbators (to use the phrase of Captain Castex) Louis XIV, Napoleon, and Wilhelm II. In those, without the power of investment we could not have prevailed.

The shield, too, would be a shoddy concern, a thing of paper : and of very thin paper at that. When it is so frequently argued that it is so impracticable to set a limit upon the use of any weapon, that it is impossible by agreement to prevent aircraft from bombing operations, how is it possible to argue that any reliance could be placed upon an agreement not to attack so tempting an objective as the vital artery of British trade ? By hypothesis, our cruiser force would have been reduced below the standard necessary for its defence, and to restore it before the fatal effects had been produced, and the nation starved, would be impossible ; or even before the neutral, with whom lies the decision in the case of infractions of international agreements, would have time to act, even if he could be depended upon to act at all.

Defence against investment by 'blockade' is furnished, and can only be furnished, by superior force at sea, properly used. Defence against investment by sporadic operations is afforded in several ways, of which three may be called measures of major strategy. Each depends on the principle of destroying the armed forces of the enemy. Before the armed forces can be destroyed they must be located, and all the measures consist in sending

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fighting ships to the places where the likelihood of finding the enemy, or what he depends upon—his 'communications'—is greatest. These are, the ports in which he shelters and victuals, the areas in which he can do most harm, and alongside the merchant ships that form his quarry. The methods may be shortly described as capture of his bases, cruising and convoy.

For the same reason that, in the case of the main concentration of force, the most effectual and rapid means of producing disablement is to attack it in its bases, so lesser concentration in outer seas is most effectually disabled. Commerce destroyers, no less than main fleets, require to rest, to re-provision, to refresh. They may be, as many have been, able to exist for some time, in small numbers, upon the proceeds of their captures at sea: and successive cruises may be made, of comparatively short duration, from home bases. Deflection of force may be procured by such raids: but serious injury to commerce can be prevented; and such operations, unless they form an essential part of other operations conducted with a definite strategic object, will not produce decisive results. To capture the oversea bases of the enemy is, therefore, to reduce his power of sporadic warfare to within these narrow and comparatively ineffective lines, as it has done whenever it has been used. Capture of bases is thus one of the most important measures in defence of trade in open waters; and this cardinal principle has always been well known in this country. Of the expeditions sent by the younger Pitt to the West

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Indies in the early stages of the Revolutionary War, the later expeditions sent thither after 1807, and the captures of the Cape, Mauritius, Bourbon, Banda Neira, and Java, some had as their principal and sole object the defence of trade, and all included it as one of their objects. The intended capture of the Cape in 1781 was, for instance, directly related to the fact that it was the source of supplies without which Mauritius, the French base, could not maintain a powerful squadron in the Indian Ocean. It was the heavy losses of trade in the Indian Ocean that forced these measures upon us,[1] and in this way the army co-operated with the navy in defending trade. Sea warfare, as I have said earlier, demands the use of all arms in combination.

In the late war the enemy possessed few oversea bases, and such as he had were taken or blocked early in the war. In home waters, Ostend and Zeebrugge were evacuated by the British forces in 1914, undamaged and available as bases for the enemy; thence, therefore, were those torpedo craft, surface and submarine, able to operate which took not only so heavy a toll of British trade in the Channel but caused so great a deflection of naval flotilla strength to furnish defence in the vital area of the approaches to London. Whatever may have been the reasons which led to this presenting the enemy with flotilla bases in a most important position, the fact that it

[1] The squadron and privateers at Mauritius were taking grievous toll of the Calcutta trade. Within six weeks during 1808 no fewer than twenty prizes, valued at a third of a million sterling, were taken into Port Louis. With the capture of the Island the back of this warfare was broken, and the losses became negligible in those parts.

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was done argues a failure to appreciate the relation of bases to sea warfare and the influence of attack in a vital focal point. The whole question brings again into prominence that inter-dependence of the services in war and, therefore, that need for co-operation in counsel to which I have referred more than once.

Though some bases may be vulnerable for various reasons, all will not be : and vessels can in any case make extended cruises from impregnable bases in home waters. It never has been, nor ever will be, possible to prevent single ships or small squadrons from getting into blue water. Such vessels, if trade be their objective, will choose those areas for their operations where the prospects of doing injury are greatest—that is, the points of convergence of trade. Any map of steamship routes will show roughly where these are. The second method of trade defence, therefore, is to send ships to those most likely areas to cruise. This method was extensively used in past wars, particularly in areas which were terminals of long ocean voyages, or when commerce particularly required constant sailings of single vessels, to escort each of which would have required a force beyond that available. Its advantages and disadvantages need not here be discussed. It is enough to say that while it furnishes a measure of security, it is not by itself an adequate protection : further, it requires the services of a large number of ' cruisers '—that is, vessels suitable for cruising.

The third method is to place armed vessels

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actually alongside the vessels to be guarded. This, while it calls also for the employment of large numbers, is the most effective : it is consistent with the principle of concentration of force at the points where it is needed. If the enemy attack the convoy he cannot escape being counter-attacked. It affords, in fact, the best opportunities for destroying the fighting forces of the enemy, provided officers interpret their duties in the true spirit of offence. Mahan, writing over thirty years ago, and with the experience of sailing-ship warfare alone to guide him, remarked that 'the results of the convoy system, when properly systematised and applied, will have more success as a defensive measure than hunting down individual marauders—a process which, even when most thoroughly planned, still resembles looking for a needle in a haystack.' His opinion was amply corroborated by the experiences of the late war. Instruments alter, principles remain : a fact which those who so loosely talk of the new weapons—the submarine, the aircraft, and the mine —having 'revolutionised' warfare would be wise to bear in mind.

It will be obvious that if effective defence against this form of attack is to be made, two things are essential—ships scattered about the oceans in stations or as escorts, and cover for their operations. The first requires large numbers acting separately, the second a strong concentrated force. Two fallacies connected with these points have been widespread recently. One is that the number of 'cruisers' a navy requires depends upon, and is

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therefore calculable from, the battleship strength. Nothing, as the needs and methods of trade protection show, is less true. The whole experience of trade protection is there as evidence in disproof. It is made upon the totally false premise that what are called 'fleet duties' constitute the sole duties of cruisers. If they did, should we have found Nelson, shortly before Trafalgar, asking for an additional eleven frigates with his fleet, when he already had twenty-six cruising vessels under his command? Since nearly all were absorbed in the essential duties of the defence of trade on the Portuguese coast, they were not available for the duties with the fleet.

The other fallacy is that it is well known that it is 'cruisers' which defend trade, and that 'battleships' play no part in its defence and are not needed. This leaves out of consideration the elementary military principle that any detached force needs cover. It deals with one half of the problem only, that part relating to direct defence, and omits the simple fact that those cruisers themselves require defence if there be a concentrated force consisting of ships either of superior individual strength or in greater numbers free to get to sea and destroy them in detail.[1]

In the late war, Germany, when her assault upon France had been arrested, was in turn assaulted and invested. She attempted a counter investment without cover, by means of submarines. It failed:

[1] These fallacies are comparable with one enunciated by a statesman some years ago that Nelson preferred to fight with inferior numbers—Nelson, whose whole tactical principles are summed up in concentrating at least two ships upon one of the enemy's!

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and it did so because it was not possible for the enemy to give cover to his submarines and thus prevent the free action of the small craft which defeated them—the destroyers, trawlers, sloops and drifters and aircraft which escorted and protected the convoys. These individually feeble craft were able to act, scattered in small bodies or singly, off the East Coast of England, in the North Sea, the Channel, and the Mediterranean. Any of them would have been helpless if stronger ships of any class could have got among them. Cruisers did, indeed, do so on two occasions in the North Sea, and also in the Adriatic; but the escorts were afterwards correspondingly reinforced, first with cruisers, subsequently with capital ships. Thus protected, the convoys continued sailing: but, as Captain Castex points out,[1] if an earthquake had sealed up the Grand Fleet in Scapa Flow or the Forth, the uncovered High Seas Fleet would have brought the traffic to a standstill within a few weeks, or even days.

It is said that trade will be attacked by aircraft in the future. Why it should be assumed that the nations of the world, having agreed that submarines shall not attack sea-borne trade except in conformity with the doctrine of visit and search, will stultify themselves by extending to aircraft what they deny to submarines I do not know. It is directly contrary to the greatest interests of the world that they should do so. But if such attack were made, defence against it presents no insoluble problem. Escort will afford defence, the necessary addition

[1] *Synthèse de la guerre sous-marine.*

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of the proper craft—aircraft—to the escorts being the obvious answer. Moreover, any nation that so acts will do so with its eyes open, and will find it difficult to forget that similar conduct on the part of Germany led, as it was bound to lead, to neutrals asserting their unquestioned rights.

To turn from trade attack and defence to the movements of armies across the sea : this operation being of practically the same nature is governed by the same broad principles. A covering force keeps the main body in check: an escort accompanies the transports. Thus, with enemy fleets or squadrons in Brest, Rochefort, Cadiz, and Barcelona, and the possibility of individual enemy ships being at sea, an expedition to Sicily is protected by covering squadrons off those ports, with a small escort to guard it against such force as it was reasonable to expect might be met at sea. The army going to France was covered by the Grand Fleet, with a second line of older ships in the Channel ; and escorted by small surface craft—torpedo boats and yachts, with airships for look-outs. Armies going to the Dardanelles or Salonika were covered by the Allied Squadron of capital ships at Taranto, and escorted by small craft. In the Russo-Japanese War, the army going to Korea was covered by the main Japanese fleet in the neighbourhood of the Russian fleet, the line of passage being occupied by detached cruisers in selected stations—the alternative of cruising instead of escort. A common principle informs all these dispositions.

When defence against an oversea expedition is

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to be made the problem has only to be reversed. Our old sea commanders from long experience knew that the enemy, to invade, must be able both to cover and escort, and their confidence in security was based on their knowledge that he could not provide both. He might indeed attempt to obtain what would amount to cover by the stratagem of a feint with his main body : but there still remained the business of giving direct protection against the flotilla, numerous small and well-armed vessels, fully effective against the transports ; and that invariably proved impracticable. Most ingenious were many of the schemes for obtaining temporary local command by means of diversions and feints; but, except in the one case of the expedition to Minorca, they were unsuccessful : and that too would have been defeated if it had not been forgotten that an army cannot cross the water unless it has sufficient tonnage to carry it. So simple are these principles that it should seem unnecessary to state them ; yet, like others referred to in my former lecture, they are forgotten in practice, as acres of barbed wire, pill-boxes and camps on the East Coast of England between 1914 and 1918 testified. Whether we are considering the defence against military attack upon this Kingdom or any of the Dominions or Colonies, the principle expressed in an Admiralty memorandum 170 years ago holds good to-day, in spite of the complete changes in material. ' The defence for our Colonies as well as our coasts is to have such a squadron always to the westward as may in all probability either keep the French in

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port or give them battle with advantage if they come out.' There is the principle of cover and the function of the capital ship, expressed in a nutshell. The National Debt would be smaller to-day, if principles, established by long experience and supported by plain logic, had governed action. And principles were never more in need than at the present moment, when warfare has extended into the air. The air definitely modifies the question of defence of territory from oversea military attack, but does not alter the principles. It affords a new and most valuable addition to the defending flotilla —that force whose particular function it is to deal with the enemy transports if they should succeed in slipping through behind the covering forces. That flotilla in the old wars consisted of frigates, sloops, brigs, and gun-vessels ; in the late war, of small cruisers, destroyers, and submarines. In each case these were capable of being assembled rapidly, and thrown upon a fleet of transports long before it could have disembarked. To this flotilla of surface and submarine torpedo craft we now have added the supermarine torpedo craft, which renders it necessary for an invader to increase the support of his invading force by craft capable of defeating the defending naval forces in the air as well as those on the surface: and that is a very difficult thing to do, unless his craft can operate from a land base.

The question naturally arises whether, in view of the assumption that the aircraft can reach the transports and the troops on landing, and cannot be prevented from attacking them by any assemblage

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of surface craft—an assumption which has a very reasonable foundation—there is now any need to furnish surface ship protection at all, or, at least that part of it represented in 'capital ships'—the cover ; and whether the whole defence may not be entrusted to the air element of the flotilla. If such should be the case, could not defence be provided more economically by an increase in the aircraft and reduction of the surface craft, since several aircraft can be provided for the cost of a single surface vessel?

Let me proceed upon the assumption that the force for defence against invasion would actually be cheaper—though I must point out that this in practice would require calculation and is not capable of off-hand assumption. The problem before the defender is to prevent an efficient and sufficient enemy force from being assembled on his shores. There are two conditions to be fulfilled by the defending force. First, it must reach the enemy army before it has disembarked or at least completed its disembarkation : and having reached it, be able to inflict such loss as will disable it. That is what the fleet or flotilla has been able to assure hitherto, and that is what the new arm of the fleet or flotilla is required to do. If it can, then, for the purposes of invasion, the vessel that flies may take over the duty of defence from the vessel that swims.

The best defence consists in destroying the expedition before it starts, at its port of assembly. That has been longed for on many occasions—it was done by Drake, considered on many occasions against ports in Spain and France, attempted between

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1801–1803 but without success. The air portion of the flotilla may be able to do this. Whether it can or cannot depends, as usual, first on whether the port can be reached by the flotilla, and whether, when it gets there, its instruments are effective. If the port is beyond flying range the flotilla must be carried, in which case command of the intervening water, which cannot be obtained without surface ship strength, is necessary. But it is possible that the air flotilla may be capable of reaching the embarkation port itself; whether when it arrives it can demolish the preparations is a matter on which I express no opinion as it becomes a question between the aircraft and the local means of defence, which is beyond the scope of my subject.

If the enemy cannot be destroyed at this point of departure he must be intercepted elsewhere: and the obvious spot is the old one of his point of arrival. This demands that an air flotilla must be capable of being assembled when wanted and in time to deal with the transport fleet in the neighbourhood of its disembarkation. Provided the numbers exist there seems no reason why this should not be done: but what the numbers required would be I do not pretend to know,—nor does anyone else. It is mere common sense, however, to anticipate that the invader will furnish a defending air flotilla, either in advance or in escort, precisely as he has had to furnish direct defence on the water, whose duty it will be to destroy the opposing air flotilla. And it is proper to assume that the attempt would not be made unless the enemy considered

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he had reasonable prospects of success—that is, that he could disable the opposing air flotilla. In which case, one may ask whether it is wholly wise to abandon other lines of defence. We did not trust to one line in the past. Pellew described the old system of defence against invasion as one of a triple bulwark [1]—the offshore squadrons, the inshore squadron, and the flotilla. It may be that the flotilla is now so powerful and so dependable an instrument, or, if increased, can be made so powerful and dependable, as to render unnecessary the alternative lines: and we may be content to entrust the command of the sea in the vital locality to that part of the flotilla which flies. But I would point out that this is a highly unprofessional way of arriving at a decision, however pretty it may look on paper. It assumes a single operation—a straightforward attempt to push across an intervening water. Such things are not done in war—except by ignorant people. Diversions are introduced, feints are made, superiority at the decisive point is worked for. An undertaking of such importance is not undertaken by crude force. It is not impossible that so large a flotilla may be maintained as to provide for everything: but whether this would be an economical use of either money or force is questionable.

Let it, however, be assumed that the air flotilla can give all the security needed. Can we then dispense

[1] 'I see a triple naval bulwark composed of one fleet acting on the enemy's coast, of another consisting of heavier ships stationed in the Downs ready to act at a moment's notice, and a third close to the beach capable of destroying any part of the enemy's flotilla that should escape the vigilance of the other two branches of our defence.'

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with the surface ship, particularly that bugbear of some people, the 'capital ship'? Yes—if defence against military invasion is the sole object of sea warfare.

But it is not. Trade has still to be defended, troops have to be moved and, possibly, operations of investment to be conducted. To defend trade, cruising vessels are needed in the approaches and on the outer trade routes, far beyond the range of the aircraft, even if such craft were armed with adequate weapons, which at present they are not. Cruisers need cover, and the covering force must be strong enough to meet whatever opposition there may be. Though, therefore, it might be possible to rely wholly upon the air flotilla for defence against invasion by troops, the surface vessels have in any case to be provided for these other services. The position taken up by the covering force is the same for all duties—defence of trade of the Kingdom, of the Dominions; and therefore, although military invasion may possibly be guarded against by the air flotilla alone, this does not do away with the need for the surface squadrons and flotilla. Reductions in the force of capital ships are not rendered possible by the air flotilla's power to guard against this particular danger. They have to be there in any case. It is within the bounds of possibility that a reduction might prove possible in the surface flotilla, some of its units being replaced by aircraft; but the strength of the flotilla is not measured on a basis for defence against invasion: it depends upon many other needs. For these reasons, although flying

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craft of the present types are unquestionably most valuable units in that particular operation of defence, the fact that the other vital duties at sea still remain to be performed, and can be performed only by vessels of the swimming type, means that great increases in the air flotilla cannot be made at the expense of the surface fleet or flotilla. Very false deductions are liable to be made if the operations of war are considered separately as though each were a separate drama. All the events by land and sea are interconnected and must be considered together.

The application of the principle of the co-operation of arms is essential to the proper preparation for and conduct of sea warfare. The particular types of ships—surface, submarine, and supermarine—must not be considered separately, but in association with each other. All ships have their limitations : none can perform every function. And just as we cannot dissociate the arms, neither can we dissociate operations. We run some risk, in my opinion, when a new danger arises, of forgetting that the old ones do not necessarily disappear ; and, in providing against this new danger, to diminish forces without which we cannot guard ourselves against the old. It is constantly being impressed upon us that a fatal blow at what is figuratively called ' the heart ' may be delivered from the air ; and that to guard against it we must increase those forces which alone can give protection—air forces—obtaining the means to do so by reducing naval force. But let it not be forgotten that, though this new danger has come into being, the danger to which

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we nearly succumbed during the war—investment by sea—will be as fatal ten or twenty years hence as it was ten years since, probably, indeed, more so. If an enemy have command of the approaches, or of the outer routes of trade, this country will succumb as surely, and with more suffering, than it would from its heart being struck. The stomach is no less important an organ of the body than the heart, and while it is clearly essential that the heart be protected, it is no less essential to guard the stomach. The forces capable of giving defence to that organ are still of the type that navigates on or in the water, for the simple reason that in the present state of knowledge such vessels only are capable of operating in those areas and in that manner in which alone protection can be given. Numerous ships of comparative weakness must be scattered in escorts or as cruisers. These must be covered by concentrated force in the form of either size or numbers ; and that concentration will be composed of ships which, whatever may be their size, are, as they ever have been, the 'capital ships.' Experience and logic inexorably lead to this conclusion. Whatever be the size of the ship potential enemies build, their opponents must possess weapons which can disable them : and, so far as all the evidence we possess goes to show, the only effective weapons are ships mounting artillery which can deliver at least as great a volume of fire as their opponents. Whether the strength be massed in one hull or divided among several is a question of tactical and technical judgment which need not concern us here.

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It is, moreover, not wholly impertinent to the question to point out that there are many nations who, owing to their distance, are not liable to attack this country by direct bombardment from the air, yet who are not unable to strike unpleasant blows at us if we cannot defend ourselves at sea. The system of defence of the interests of this Empire cannot be based upon considerations of one form of attack alone, which can be delivered only by a minority of possible enemies.

I have now made a very superficial examination of some of the principal elements in sea warfare. Its ultimate object has been shown to be to stop the vessels which carry trade or troops, and ensure its own trade or troops being safely carried. It attains its object by disabling the fighting forces which protect or oppose the passage of those vessels. Thus we have two stages which, however much the second may be included in the first, are fundamentally distinct ; and need examination separately in considering the requirements of the vessel which shall be capable of fulfilling the needs of sea warfare.

Disablement of the fighting forces may be attained, as we have seen, by more ways than one. Some require co-operation of all arms of the national equipment, naval, military, and air, as when an enemy can be disabled only by attack in his harbours; some of the arms that fight at sea only, swimming, diving, or flying, as when an enemy elects to fight at sea. These arms must in combination possess the power of disabling the enemy. If they are weaker,

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in whatever terms you may measure weakness, they cannot do so.

I will not stop to discuss at length what constitutes weakness beyond remarking that a battleship alone in narrow deep waters is weak *vis-à-vis* a submarine ; a submarine is weak *vis-à-vis* a destroyer ; a destroyer by day is weak *vis-à-vis* a battleship in a heavy sea. So, too, a battle-cruiser squadron may suffer damage at the hands of the aircraft of a carrier ; but an aircraft carrier is at the mercy of a light cruiser, and a light cruiser has no chance against a battle-cruiser. Similar analogies of dependence of various arms upon each other exist in military establishments. ' Weakness ' is thus a qualified term, and depends upon conditions and combinations.

The most complete sea-fighting force is that which combines all, the heavy ship for strength against heavy surface ships, and the remainder, each for its own purpose, in association with the heavy ship. Many of the misconceptions concerning the values of the various classes of ships arise from a failure to consider them in association, and the relation each bears to the other. To say that a large ship is useless or helpless because she requires a destroyer escort is analogous to saying that field artillery is useless because it cannot act alone without infantry, or bombing planes useless because they need the defence of fighters. The greatest individual strength can be obtained in a ship which fights on the surface : and to the strongest class of ships the name of ' capital ships ' is given. The

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term is an old one ; it has been used variously to mean either any heavy ship, a three-decker, or a flagship. Within recent times it has become associated with the heaviest ship that it is possible —or permissible, which amounts to the same thing—to build. Whether a fleet should be composed of a few very heavy ships, as some think, or of a greater number of smaller ones with a corresponding armament, as others believe, is a question too technical for discussion, nor is it material to the problem at this stage : which problem is, *is there any criterion, and if so what, by which to determine the size that this essential element in sea warfare, the so-called 'capital ship' must be?* Is it, for example, possible arbitrarily to say that she must be (assuming such a ship might or could be built) one of 100,000 tons or one of 1000 tons ?

It seems possible that some conclusion may be indicated if the question of the size of a man-of-war is referred to function—that is to say, considering what end she has to attain, and seeing what size is necessary to enable her to attain that end.

The first function, as I have repeated many times, is to disable the fighting ships of the enemy. In the past the needs of this primary function have been furnished by constructing a ship of approximately the greatest size of which the shipbuilding skill of the day was capable and carrying the heaviest guns that could be worked on shipboard. I say 'approximately' advisedly, for British capital ships ranged through many rates and were often of a lesser size and carried lighter armaments than those of the

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enemy, though the ships were more numerous. The *Victory* of the mid-eighteenth century displaced a little over 2000 tons. Knowledge of ship construction increased and the last three-decker (*Duke of Wellington*) displaced nearly 6000 tons. When iron or steel took the place of wood in construction it became possible to build larger. The ship, therefore, grew still more. The 'ironclad' that followed her—the *Warrior*—reached 8800 tons. Thence onward an almost continuous rise in tonnage took place (*Devastation* 9300, *Collingwood* 9500, *Nile* 12,000, *Royal Sovereign* 14,150, *King Edward VII* 16,350, *Lord Nelson* 17,500, *Dreadnought* 17,900, *Hercules* 20,000). And with this rise of tonnage ran an almost continuous rise in the calibre of the primary armament. I will not weary you with technicalities before 1889, but will remind you only that the 'battleships' of the Naval Defence Act of that year carried 12-inch guns, which remained the standard size for about twenty years, after which increases to 13½-inch, 15-inch and 16-inch took place.

Wherein lay the reasons for these increases in tonnage and armament? Had the character of sea warfare altered? Or had the vessels of the earlier times proved too small, or too weak, or too little protected to fulfil their first and immediate function—that of disabling the enemy? Or had the functions of the capital ship undergone some change, so that these successively greater tonnages and armaments formed indispensable characteristics of the 'capital ship'?

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Disablement of the enemy being the object in sea warfare, we cannot avoid asking whether disablement is practicable only if ships are armed with a particular weapon. Cannot, in fact, one ship or squadron fight another unless both have 16-inch, 15-inch, 14-inch, or some such heavy pieces? Clearly, there is nothing in function to confirm such a view, otherwise fleets and squadrons of which the ships are armed with 32 or 42 or 64 pounders of the three-deckers, or 9-inch or 12-inch guns of later dates, would have been unable to perform what was required of them in their day: which as a matter of pure fact we know they could do. But when mechanical and metallurgical science enabled larger weapons to be made, and as their possession conferred additional strength, so, if one navy increased its calibres and consequently the tonnage which became necessary to carry the guns, others could not do otherwise than follow suit; not to do so would have been to possess inferior and therefore useless weapons. So increases, the result of competition, itself the result of the invention of heavier artillery and shipbuilding skill, followed. Pepys even remarks upon it in his day. 'Let it be considered whether the world's falling to the enlarging the burthen of their ships *from the small size that they anciently were limited to*, did not spring almost at once through all the European parts of any note for their navigation, that is to say, within one century or less, namely, *upon the invention of great guns and the employment of them in sea service*; and together with the increase of their burthen, the

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increase also of the strength in their fabric, as well for bearing the weight of their own guns as withstanding the shot of their adversaries.' [1] It is the same story as to-day of guns and armour. Yet in the long run no nations were relatively one whit more powerful than they had been before they did so, except, possibly, those who initiated the increase, and then only temporarily. Each new programme of construction embodied, therefore, an improvement in type—in other words, an increase in size. Competition drove all the navies up the steep rise : none, and this nation in particular, felt it could afford to risk getting behind in the race.[2]

Omitting all questions of policy *vis-à-vis* other nations, and concentrating attention solely on the strategical and tactical qualities necessary to enable the principal ship of war to perform her functions, what are those qualities ? They are : that she must be able to reach the place where her opponent is to be found ; to maintain herself in that position long enough for the services required ; and to fight whatever enemy forces oppose her, fighting being considered not as separate individual duels but as combats between combinations of ships, ' ships ' being all vessels capable of fighting at sea—surface, submarine and supermarine. So far as fighting is concerned the size necessary to fight is

[1] *Samuel Pepys's Naval Minutes*, N.R.S., vol. lx. p. 425.

[2] I will not stop to enquire whether, as a result, this nation increased its power at sea, beyond remarking that whereas in 1906 we possessed a two-power standard and a superiority in ships fit to ' lie in the line ' of twenty-three ships over Germany, in 1914 we no longer had a two-power standard, and our superiority of such ships was eight.

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roughly determined by the size of the enemy. Success is measured by the degree of completeness of the enemy's disablement ; complete disablement, material and moral, resulting from decisive action and destruction of the enemy's material or moral, or both. Given that fleets are composed of ships of approximately the same size, what that size is does not affect the decisive character. No more decisive an action can be fought between fleets composed of ships of 100,000 tons than that which was fought off Aboukir with ships of some 2000 and less, or that in the Straits of Tsushima, where the most powerful ship was of some 15,000 tons, or that off Salamis in 130-foot galleys. If one should imagine that, in desperate battle, the British and German fleets had destroyed all of each others' capital ships, and nothing behind them existed above the various cruiser classes, would sea warfare have come to an end because there were no great, or 'capital,' ships left? Certainly not. The next sized ships would have become the 'capital' ships—those armed with 9·2-inch, 7·5-inch, and 6-inch guns ; and these would have performed the functions previously performed by the larger classes. If we imagine a still further holocaust, and nothing larger than, say, the 4000-ton light cruiser class remaining, the same thing would have happened. These ships were capable of reaching the positions needed, maintaining themselves there, and fighting the enemy—since the assumption is that their force is similarly reduced—acting in fact as covering forces if cover were—as it would be—required.

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The question which naturally suggests itself is, where can this theoretical reduction of size stop? The downward limitation is reached when the vessels cannot keep the sea sufficiently to perform the work required of them.

Thus, size, in respect of this first and immediate function of fighting the enemy, is mainly a relative matter. It is positive only in regard to sea-keeping, the limitations of which in the smaller classes of ship render them unable to perform the functions which the operations of war require.

Passing from the immediate function of overcoming the armed force to the ultimate function of controlling the sea, a size limit is indicated by that function. To exercise control, the force of the vessels exercising it must be greater than that of those users of the sea—the trading and transporting vessels—which it is necessary to master, even though temporary armaments should be fitted, and vessels in greater number should have to be dealt with. Merchant vessels can and may be armed, as we have seen in all wars from Pompey's expedition against the Mediterranean pirates in 66 B.C. to 1914. The ships whose business it is to control the movements of shipping need to be more powerful than they, precisely as the police force must be more powerful than the law-breaker. Although a man-of-war might possess all the qualifications for the operations against the enemy fighting forces on a 'small' tonnage, such a tonnage might not—I do not say it would not—be enough to compel compliance upon a merchant ship, armed as a merchant

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ship can be armed. Victory without its fruits is sterile, and the fruit of victory is the power to control. Thus, if the instrument, though capable of tactical victory over the armed force, is not strong enough to *exercise* control, it is useless. What tonnage is required for this purpose is calculable from a consideration of what armaments can be installed in mercantile vessels.

This, however, does not exhaust the subject, since to-day there are conditions which did not exist 200, 100, or even 20 years ago. Two new types of vessel capable of disputing the command of the sea have come into existence—the submarine and the supermarine. It is for consideration whether, and if so in what direction, these vessels influence the size of the surface man-of-war.

So far as the submarine is concerned, in what manner does she, as we know her and as far as we can anticipate her development, influence the size required for the surface ship? Does her entry into the list of combatant types necessitate either an increase or a decrease of size?

Notwithstanding the advent of these two new types of 'weapon carriers' (for that is what a ship in reality is) at sea, the surface ship remains at present the decisive factor. No other type combines the powers of offence and mobility to the same degree as she. The aircraft has not sufficient endurance and range, and even though she should in the future prove an influential instrument in narrow waters, against surface ships by day, though whether a dominating one it is as yet too early to predict, she

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cannot *exercise control* without using her force in such a way as to injure neutrals and produce, precisely as the submarine produced, their intervention. She cannot exercise visit and search : when she can it will be a different matter. The submarine can be given both sea endurance and range, but—provided one portion of the agreements [1] are adhered to—she is not effective as a weapon for exercising control : also, as experience (which is our best guide) has shown, her capacity to do harm can be kept within bounds by the surface craft when used in a proper manner. Command at sea rests for the present, and as far ahead as we can see, with the surface ship.

The principles of concentration and cover call for massing of strength. The vessels of which such necessary concentration is composed have always been those of the largest types, for which the name 'capital ship' has of late years been revived. This force of concentrated power in capital ships is the foundation of naval strength, and those capital ships are, at the present day, large surface ships. What the future may hold for us we cannot tell : only very rash people would dogmatise on the subject as to whether the surface ship will at some time hence be replaced as capital ship by the submarine or the aircraft. There is, however, no question that the submarine challenges the command of the sea. She has the power to approach unseen, and she carries a weapon which, if it strikes, will temporarily

[1] There are ambiguities in the Root agreements. Articles 1 and 4 (par. 2), for instance, are not reconcilable.

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disable or may even sink the surface ship. The inaccurate nature of her weapon obliges her to make her attack at comparatively close quarters, its size prohibits her carrying a large stock of 'ammunition.' Are these disabling or destroying results best counteracted by an increase or a decrease in size?

Subjecting the question to the practical experience in war, we cannot fail to notice that the surface vessels which feared the submarine least were those of the smallest classes—the destroyer, the torpedo-boat, the motor-boat, trawler or sloop. These light craft were kept constantly at sea: their occupation was in the waters where submarines were most numerous. Far from needing satellites to defend them against submarines, they were the principal effective offensive instruments against them. Their speed, light draft and handiness, gave them a capacity to avoid, or largely to render ineffective, the enemy's weapons, while it conferred upon themselves the power effectively to attack the submarine with weapons of great destructive power—explosive charges. In the neighbourhood of the very great ships the submarine was the hunter. In the neighbourhood of the destroyer she was the hunted.

The light cruiser was less immune than the larger ship. Yet she, too, operated constantly in waters occupied by submarines, in the North Sea and the Mediterranean. Some few were sunk.[1] Others were hit but regained harbour. But very many were not hit at all.

[1] Thus the *Nottingham* sank only after being hit by three torpedoes, and the *Falmouth* after four.

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The larger the vessel, the greater were the precautions taken to guard her, for she could not guard herself, nor counter-attack with certainty.[1] She it was, in fact, whose mobility was most impaired by the submarine. This is not to say that she was deterred from going where she was required. But she went at high speeds, zigzagging, using much fuel, and thus restricting her power of keeping at sea, and accompanied by other craft as escorts—craft badly needed for the defence of trade. Her action was circumscribed, while that of the lesser vessels was far less affected.

Thus, security was largely a question of size. The smaller the ship the less easy was she to hit. Security, or a measure of security, can, however, also be conferred by other means. As in medicine the effects of malarial fevers may be counteracted either by prophylaxis or cure, so in the case of ships the effects of torpedo fire may be counteracted either by making hitting difficult or by resisting, or limiting the injury done by, the blow, by means of armour or other forms of defence. The former method requires diminution in size; the latter requires increase. Whether consistently with retaining the sea-keeping capacity without which a man-of-war cannot conduct the operations for which a navy exists, size can be reduced to such an extent as effectively to reduce the chances of being hit; and whether, consistently with the requirements of dock-

[1] A submarine was sunk by a battleship ramming her—the *Dreadnought*; another by a cruiser (*Birmingham*). But these solitary instances cannot be taken as evidence of certain powers of counter-attack.

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ing, and other factors, the size can be sufficiently increased effectively to reduce the effect of injury from torpedoes, are questions upon which the decision depends. The degree to which protection can be afforded by each measure needs comparison: and the resulting effect of each measure upon the capacity of a navy to perform its function has then to be considered.

To turn from the influences of the submarine to those of aircraft, the same arguments apply; for the weapons are of the same order. The danger of destruction or disablement by a torpedo, launched through the water or dropped from the air by a supermarine vessel, can be reduced either by lessening the chances of being hit or increasing the powers of resistance if hit. Increasing the powers of resistance calls for additional weight in the form of armour or some forms of underwater construction—that is, a larger ship. As in the case, therefore, of the submarine, it is for consideration whether the advent of the aircraft is best provided for by the means of prophylaxis or cure. The conclusions arrived at need then to be co-ordinated with those reached concerning the size necessary for the surface ship, to which the earlier arguments referred.

The nation the circumstances of whose existence make the maintenance of superiority at sea essential, and therefore an element in its national policy (as sea power long has been for this country of ours), must, as Britain has done, provide herself with superior numbers of the ships which conditions admit. In the past the limitations of the material—

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wood—prevented any nation from building ships of more than two or three thousand tons. Those ships were effective instruments, as our history demonstrates. To-day, the limitations of material have gone, and we could without difficulty build ships of twenty times that size : but a new form of limitation has come into existence, which is not one of material but of international agreement. By agreement the size has been restricted. The functions, however, of the ship, whether of 1000 or 100,000 tons, are the same. The size, from a purely military aspect, is, as the preceding remarks indicate, immaterial, with the qualifications referred to. The ship must be able to reach the area where her services are needed and operate in the manner the performance of those services demands.

If I have reiterated the word 'Principle' it is because I see in the columns of correspondence either an ignorance or a disregard of the principles of sea warfare that I conceive to be highly dangerous to the State. For I firmly believe that without principles in warfare, no less than without vision, the people perish. All the study I have made of sea warfare goes to confirm the words of the old Trimmer, Lord Halifax, which I recall as being as applicable to the Britain of to-day as they were to the smaller nation of 1694.

The importance of our being strong at sea was ever very great, so in our present circumstances it is known to be much greater : because, as formerly our force of shipping contributed greatly to our trade and safety, so now it is become indispensably necessary to our very being. It may be said

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now to England, 'Martha, Martha, thou art busy about many things; but one thing is necessary.' To the question, 'What shall we do to be saved in this world?' there is no other answer than this—Look to your Moate. The first article of an Englishman's creed must be that he believeth in the sea.

Believing in the sea is one thing. Having reasoned grounds for that belief is another, and those who would introduce a new creed must possess such grounds. They reside in the principles of war, and those principles are to be discovered in history of war, which, as I believe, those whose business it is to direct policy, or whose ambition it is to influence opinion, should study as a preliminary to the formation of an opinion. Knowledge does not come intuitively in the science of war, nor does capacity in the art. The source of knowledge is experience, either that of one's self or of others. Profiting by the use of such experience as is obtainable, one may begin to consider the use and influence of, and the reactions and readjustments resulting from, the introduction of new weapons; and thereby avoid the lament expressed in Petrarch's lines:

> By sad experience taught I learnt at last
> Wisdom's best rule, to profit from the past,

so that if war be the *ultima ratio* and no other manner of solving differences be practicable, we may be in a position to make the most efficient, which is another way of saying the most economical, use of the national weapons with which in consequence we are obliged to continue to furnish ourselves.

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LAND WARFARE

BY MAJOR-GENERAL SIR EDMUND IRONSIDE

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LAND WARFARE

I

BY MAJOR-GENERAL SIR EDMUND IRONSIDE

I PROPOSE to address my remarks primarily to the students of the University, though I see that there are others present. I will divide my subject of Land Warfare into two parts:

(i) Organisation and Training.
(ii) Operations.

I will treat the question of Land Warfare only as it confronts the British Empire. I am not here to justify war, for that is not the business of the soldier, and I shall commence by reading you three quotations from the 'Field Service Regulations,' the *vade-mecum* of the British soldier.

(i) War is the ultimate resource of policy, and every nation must be ready, in the last instance, to protect its vital interests by force of arms unless it is prepared to surrender them to an enemy without a blow.

(ii) War can be brought to a successful conclusion only by the defeat of the enemy's armed forces and the destruction of his powers of resistance. The object to be aimed at in designing an Imperial Army is to produce an organisation which can achieve this result in the minimum of time, with the minimum expenditure of men, money, and material.

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(iii) In the face of the greatest military danger which can arise, the requirements of the British Imperial Army do not differ materially from those of the more centralised Powers. The British Empire, however, is faced with problems differing widely from those of any other Great Power. In the first place, it consists mainly of a group of self-governing communities of varying populations and resources amongst whom military obligations must be equitably distributed. In the second place, unlike a Continental Power, whose army is designed to provide against one definite military contingency, the conditions under which it may be called upon to place a force in the field vary from a world war to a small expedition against an uncivilised enemy.

From these quotations it will be seen that the task which faces the British military authorities is no light one. The position of the strategist all the world over is difficult, but that of the British strategist is particularly so. Not only are the statesmen, who direct the policy under which he works, unable to tell him exactly when he will be required to act, but also they cannot say in which quarter of the Empire—which is the same thing as saying of the world—the main scene of military action will lie. The equipment, training and maintenance of suitable forces for the many different natures of country and climate are matters of the greatest difficulty. Moreover, the fighting forces at the disposal of the Empire are maintained by self-governing Dominions and cannot be ordered about by any central military authority in peace-time. Each Dominion is naturally responsible for its own local defence, but the obligations it assumes towards Imperial defence are purely voluntary.

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Thus, the British strategist can never hope to put in his all in one great blow which will break the enemy completely, as is the aim of his continental brother. He is indeed greatly handicapped.

The chief characteristic of the Imperial military forces is, indeed, the slowness with which they can be developed—a matter of months compared with days as it is with Continental Powers. Something must be done to safeguard the Empire during the period of development, and what we do in actual fact is that we maintain a small force of highly trained men, which operates with the Navy and the Air Force, and behind which the great man-power of the Empire can be prepared for action. Many of the Dominions are yet but sparsely populated, and they are not in a position to maintain military forces commensurate to the extent of their territory. For years to come the main arsenal of men within the Empire will lie in Great Britain. Thus it is that the great body of immediate Imperial defence has to be maintained by the Mother Country in the shape of what is called the Regular Army. The self-governing Dominions maintain only small permanent cadres for the purpose of training their citizen forces.

Distances within the Empire are great, and even with the best of sea-transportation and a Navy and an Air Force which can ensure safety during passage, long periods must elapse before considerable military forces can be transferred from one distant point to another. The British strategist must, therefore, maintain a certain proportion of his covering forces

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outside Great Britain in peace-time for the safety of communications and exposed possessions, despite the favourable position of this country as a sea-centre for the Empire. These foreign garrisons he regards as more or less fluid, so that upon the first sign of trouble, adjustments of strength can be made towards the threatened area, replacements being made either from Great Britain or from any unthreatened point in the Empire. The strategist must, in fact, forecast critical military areas by watching the changing political situation.

It can be imagined that in the circumstances which I have just described, the organisation and training of the British Regular Army must differ considerably from those of continental armies. The Regular Army's development has been gradual, and it has been built up on a vast experience of war of every kind. Its organisation is peculiar to the British Empire, and in consequence few foreigners have ever been able to estimate its true value, differing as it does so completely from conscript armies. Firstly, it is composed of volunteers, since no conscript could be ordered to serve outside his own country in time of peace. Secondly, the men composing it are highly paid, because they can only be obtained in competition with the labour market. Thirdly, the terms of service are neither short nor long. A short-service army could not supply men for distant garrisons, for the expense of sending men there for a few months only would be prohibitive. Nor is a long-service army any more desirable, for men who serve for long periods abroad, often in

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bad climates, deteriorate quickly, and moreover they do not assimilate well with the civil population when their service is ended. There is also the drawback that a long-service army does not produce a Reserve; for men of 40 years of age, the age at which long-service men would quit the ranks, are no longer fit for active service in the ranks.

The terms of service of the Regular Army have, therefore, been fixed, generally speaking, at 7 years with the colours and 5 years in the Reserve. The men whom we get thus leave at their best and they do not return at too late an age to civil life to allow of their being readily absorbed into the rest of the population. I will show you how it works out. A lad of 18 or 19 enlists and serves his preliminary training in Great Britain. He is sent abroad at 19 or 20, and returns home again, after 5 or 6 years of foreign service, at the age of 25 or 26. He then passes to the Reserve until he is about 30 years of age. After that age a soldier can no longer be considered at his best for service in the ranks. Only a small proportion of the men who enlist are allowed to extend their service to 12 or 21 years with the colours, those who do being the non-commissioned officers, who make a profession of the Army and serve on to gain a pension. One of the greatest difficulties in a conscript army is to get good non-commissioned officers; but with us, in our Regular Army, you will see that we have a very high class of man in these positions. The reason for restricting extensions of service is, of course, that we do not want a long-service army and we do

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want a Reserve. The importance of a Reserve for the Regular Army may not be apparent at first sight. It is cheap, for you retain the services of highly trained fit men for a nominal sum. It also provides trained men to fill the gaps caused by casualties in the first months of a campaign. It makes the Regular Army self-contained for at least a short period of time. The numbers in the Army Reserve are carefully watched, and if they become low, men are passed to it at their own request before their period of colour service is over. What is required, however, is steady recruiting and a steady flow of men through the Army to the Reserve, so that there may not be any 'lean' years, so to speak.

It is fortunate that the British Isles are so centrally placed in the Empire, for we are thereby enabled to keep a large portion of the Regular Army in a temperate climate. The main foreign station of the Regular Army is, of course, India. Here, despite the vagaries of climate, the training facilities are good, and there is often actual fighting taking place on the frontier. But there are many small garrisons where the training advantages are almost non-existent, owing to lack of space and lack of other arms of the service. Consequently, units are kept on the move at stated intervals. Here, again, there is a great difference between our Regular Army and a continental army. Our army must be ready to fight at short notice and to move anywhere immediately. It would be disastrous if it were allowed to settle down into a groove as a foreign unit does.

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The actual system under which the Regular Army works is called the Cardwell system, having been initiated by a former War Minister. Roughly it is as follows. The number of units necessary for foreign garrisons is calculated up, and then for every unit abroad a similar unit is maintained at home. The home unit is the 'feeder' for the unit abroad. The units at home are then grouped together in Brigades and Divisions to form what is called the Expeditionary Force. From this you will see—and it is an important thing to remember—that the size of the Expeditionary Force depends absolutely upon the number of units we keep abroad for peace garrisons. Its size in no way depends upon our relations with other Powers. These home units are much hampered by the sending of large yearly drafts to their sister units abroad, and lately they have been relieved of the training of recruits, which under our voluntary system come in irregularly and not as in conscript armies. Recruit training and preliminary education are carried out at the depots of regiments, usually situated at the county-town of their county. The recruit thus joins his home unit fit to take his place in the ranks at exercises in the field and with his education in good order.

Just a word on the subject of education. It is the educated brain which will best stand the strain of war, and the Regular Army insists upon a high standard. There is no escape from school and no extra pay until the educational tests are passed.

Now I come to the expansion of the Regular

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Army. It and its Reserve should be sufficient to deal with the important 'small war,' as campaigns against anything but a first-class enemy are called. But, in the case of a big war the army must be expanded still further. Up to now, we and our Dominions have always depended upon what I shall call the 'Come gather round me, boys,' method. This method, which we employed in the South African and the Great War, gave us nothing but a mass of untrained recruits from all quarters of the country. Modern war demands the highest organisation, and the old method will no longer suffice. In Great Britain it has been decided that the Territorial Army shall form the method of expansion of the Regular Army. Doubtless, the Dominions will also expand their forces upon their existing system and will not raise a popular cry for new units at the outbreak of war.

I should like to digress for a moment about two things. The first is Volunteering. The system of volunteering for military purposes is understood by few of the continental Powers. Their peoples seem to say to themselves 'If the nation requires me, it will order me to go,' and so they do not volunteer. The tradition in the British Empire has always been to volunteer, and our men have become accustomed to fighting abroad, for few of them have not had either relations or friends in the Regular Army. The British soldier is seen at his best abroad, whereas the men of the Continent seldom fight well outside their own countries. The second is County Spirit. The Territorial Army is organised

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by counties, and it is of the utmost importance to maintain this spirit both in peace and in war. It is a most important factor in the maintenance of *moral* in the field and connects directly the people at home with the fighting man in the field.

The 'Come gather round me, boys,' method has gone for good and all. Promotion to the ranks of officer and non-commissioned officer in war, which should be the aim of all educated men, will be made through the Territorial Army. No one, whatever be his influence, will be able to reach a position of responsibility in the military forces by any short cut on the outbreak of war. The knowledge that this is so should be spread wide among educated young men, who at the moment are coming forward only slowly in peace-time to serve as officers and non-commissioned officers in the Territorial Army.

I cannot lay too much stress upon the necessity for good organisation. Let there be no feverish improvisation upon war becoming imminent. Even if improvisation will later become inevitable, in order to meet the unexpected, let the first plans for mobilisation be executed upon a well-considered scheme. Let us have the cadres and the paper organisations, bad substitutes as they may be, even if we cannot fill them with men at the moment.

Now I come to the question of armament. Peace after any war is always a period of transition. The wiseacres of the armchair always accuse the soldier of looking backwards and of never learning his lesson. I would ask you to remember that there is only a limited amount of money available for our

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armed forces, and this amount has to be divided between the Navy, the Army, and the Air Force. No one of these three services ever receives all the money it requires. In all democratic countries there is always a sluggishness in providing funds for war purposes in the piping times of peace. The lack of foresight of which the critics complain is often really a lack of funds.

Let me give you an example of this. One of the first principles of war is the maintenance of mobility. An army which can move about quickly always has the advantage over one which is slow and immobile. We are now entering the mechanical age, and armies will make more and more use of mechanical vehicles to maintain their mobility. We are likely to use fighting vehicles, such as tanks and armoured cars, and transport vehicles of varying capacity from a few hundredweight to several tons. Of wheeled transport we may say that a sufficiency will always be available from civilian life, and the factories which supply peace-time requirements can be enlarged to increase supply. But of the tracked vehicles we cannot say the same thing. Tracked vehicles are not at present in commercial demand. The Army can, therefore, get none from civilian life, and there are no factories to be increased. The Army must maintain all that it wants and subsidise factories if necessary. Machines cost more in consequence. Let us take a tank unit with, say, one hundred tanks in it. The initial outlay is great, but this is by no means the only consideration. Upkeep and replacements are also prodigious. You have only to look at the published accounts of any big

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transportation company to see this. The useful life of a machine is not so great as the useful life of a horse in peace-time. One more point to remember is this. Men have now to be specially trained for mechanical work after enlistment. Nobody can get a licence to drive a car until he is seventeen, and as the recruits join at eighteen there is little time for experience to be gained. In the old days there could be found plenty of lads with experience of horses.

Do not for one moment imagine that by reciting all these difficulties I am trying to prove to you that mechanical vehicles will not be used in large numbers in the next war. They most certainly will. But I should like you to meet the armchair critic with the fact that if a vehicle is not a commercial product it will not be forthcoming in large numbers at the commencement of the next great war. No feverish energy will give them to him, for production in large numbers, as we learnt in the last war, can only be achieved with time.

The Army is experimenting. Advance in mechanical science has been rapid, and we do not know how the new tracked fighting and other vehicles will develop. For the moment it would be insanity to invest our limited money in buying machines which would be obsolete very quickly.

Mechanisation and some of the new forms of warfare practised in the late war have also added to our difficulties by assailing the Cardwell system—the basis of our Regular Army organisation. I will explain to you why this is. India, the main foreign station of the Regular Army, maintains its

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own Indian Army recruited from Indians and officered as to its higher ranks by British officers. In addition she pays for the maintenance of a number of British units. Her Government decides the number there are to be of these units, and the proportion of the various arms. Roads in India, and especially on the North-West Frontier, where most of the continual fighting takes place, are not like those in Europe. Mechanisation cannot be as complete there as it can be in Europe. Many of the districts on the frontier are indeed only suitable for the most nimble infantryman. No tank has yet been constructed which is suitable for the terrific heat encountered in an Indian hot season. The danger from enemy aircraft and gas cannot be considered so great in India as it is at home. India, with a democratic Government, naturally does not wish to maintain useless units, and thinks first of her own local defence. She may even refuse to accept a unit—say of anti-aircraft, tank, gas or machine-gun—which she does not consider essential, but which may be absolutely essential for warfare in other parts of the Empire or in Imperial struggles. The result is that, as mechanisation goes on, as air warfare becomes more severe, the British Government will find itself forced to maintain special units at home, which are not 'feeders' for the main foreign garrison, that in India. Naturally, the men forming these units will not be required to serve abroad and will not get the benefit of going out into the Empire—a very definite benefit indeed. They will have to be maintained altogether outside the Cardwell system. Also, if the men who

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do serve abroad are not to be passed through training of the most modern kind and are never to see the modern units, they will pass to the reserve with incomplete training and will not be up to the standard required.

We must try to maintain the proper proportion of modern units in our foreign garrisons. Our Regular Army is an Imperial Army, and it is important that it should not specialise in only one kind of warfare.

I cannot leave the question of Organisation without touching upon the question of the air units for the Army. I say what I am about to say in no carping spirit of detraction of the Royal Air Force and with no desire for its abolition. In my opinion, the Army suffers greatly in that some of its essential services—artillery observation and reconnaissance—are in the hands of another service. I believe that one might just as well take away the mechanical tractors for the artillery and place them under the Army Service Corps as to take away the Army's aircraft and place them under the Air Force. Evolution will probably put matters right, and I am convinced that as aircraft become more common they will be regarded—apart altogether from fighting and bombing aircraft—as vehicles. We wish to use them as vehicles to carry our expert observers and to ensure that our commanders and our artillery get the very best information.

Now I will touch shortly on Training. As I have already told you, the Army insists upon education. The whole basis of training rests upon a proper understanding of an order. In modern war, move-

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ment under heavy fire is impossible, and men must act on their own initiative after having been given a task to carry out. Only the educated brain can rise to the occasion in case of great strain, and only the educated will take command of others.

Physical fitness in the Army is insisted upon. In their spare time men are encouraged to play all manner of games—mostly games in teams—where each man has to play for his side, to co-operate, and to obey the instant order of the referee. All ranks are encouraged to play together, both officers and men, and to play for the honour of their unit, whatever it may be.

There has always been a school of thought which accused the Army of thinking too much of 'spit and polish,' and undoubtedly there was a type of commander who drove the polishing of buttons to an extreme, for he did nothing but that. 'Cleanliness comes next to godliness,' says an old saying. A well-turned-out man has more self-respect than a man who is dirty. Orderliness goes with cleanliness, and orderliness means speed. If people know always by habit where things are they will be quicker in an emergency. I am quoting you old proverbs, and here is another: A stitch in time saves nine. Never was a proverb more true than in these days of mechanisation. Dirty motors and dirty machines mean breakdowns and inefficiency. A clean unit will be more efficient in the hands of a good commander than a dirty one.

The corner-stones of our British Army are education, discipline, courage, and cheerfulness.

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LAND WARFARE

II

BY MAJOR-GENERAL SIR EDMUND IRONSIDE

In this my second lecture upon Land Warfare I propose to deal with Operations. I have already shown you how our Regular Army is in reality the spearpoint of our Imperial power, to be driven home when required by the might of the Empire in the form of the Territorial Army at home and the forces of the Dominions abroad. I have told you of some of the difficulties of organising and training an army for Imperial needs, and I shall now endeavour to describe some of the different operations which may face us in the future. These operations will vary from a great war of the dimensions of the last great struggle to a small war waged by a few companies in some remote corner of the Empire.

Let me first take a great war. Hitherto, our wars in Europe have always been waged in co-operation with some ally, in pursuance of our general policy of maintaining the balance of power amongst nations, and thus ensuring peace for Imperial development. I see no reason to think that we shall depart from this policy in the future. The

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measure of our effort on land has always been gauged by the strength or weakness of the ally with whom we are working. Our main pressure has been exerted through our naval forces, our land forces being kept just sufficiently large to ensure that our ally was not beaten on land.

Since the days of 1914–18 a great change has come upon the situation. We are no longer an insular power. We can no longer emerge from Great Britain feeling all the time that our main base of operations is safe behind us. Circumstances, ever increasing in number, now make it possible for European enemies to attack us at home through the air. We may be quite sure, therefore, that when we are engaged in a struggle with European nations, whose air forces can carry out an economic attack against the main Imperial Base, Great Britain, we shall certainly have a period of intense air warfare. Circumstances seem to point at the moment to this air warfare being waged over Great Britain.

I consider, therefore, that our land forces will not leave their various points of concentration in the Empire, for transportation to the main theatre of action, until a reasonable air supremacy—temporary perhaps—has been secured. How long this intense air fighting will continue it is difficult to say. In my opinion this period can only be short, owing to the heavy casualties which will ensue in both men and material—a matter of weeks at the most. At any rate, as far as the land forces are concerned, there cannot be any immediate despatch of an Expeditionary Force such as there was in 1914.

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There is a school of thought which has arisen and which asserts that air forces alone will in future be able to destroy the power of resistance of a nation before its land forces can be brought into play. They point to the dangerously concentrated position of London, and maintain that we are especially suitable as a target for such enemy economic action. I do not agree with this school of thought, but for the moment will only say this. Given proper anti-aircraft defence, which will consist of both aircraft and anti-aircraft instruments such as guns, search-lights, nets and the like, and a proper employment of them, enemy casualties amongst the hordes of bombers necessary to accomplish our economic destruction will be so heavy that they will not be able to carry out their programme. Personally, I cannot see two nations, each assailing the other's economic resources and seeking by a species of reduction of *moral*, by intimidation and attrition generally, to bring the enemy to his knees. Could there be a more farcical battle of Kilkenny cats? The great fleets of enemy aircraft, which will be necessary to produce the results desired, will be as vulnerable as any Armada, and it is for us to deal with them as we did in the days of Elizabeth—meet them over their home bases and when actually in these bases, always as far from the home country as possible, with our mobile air forces, and receive them heartily with our immobile anti-aircraft defences, should any of them succeed in reaching the air above their objectives.

It seems to me that in such circumstances the

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land forces will have increased time for mobilisation and preliminary training, though they will be more liable to interruption during this phase. They must be ready to supplement the anti-aircraft defence of the country to the utmost with the small-range weapons at their disposal. Special preparations will be required for the dispersal of troops. There will be none of the old peaceful concentrations. Bases, depots, camps and the like will have to conform more and more to the principles of front-line warfare. They must be more dispersed and must be protected by camouflage and anti-aircraft fire.

Direction of affairs during this period will undoubtedly be in the hands of the Air authorities.

Now let us imagine that a sufficient security from air attack has been achieved and that the land forces, of a size sufficient to maintain our ally in the field, have left for the chosen theatre of war. The direction of affairs will then pass from the Air to the Army authorities. Air fighting and air action will, from this point onwards, be concentrated more and more over the area in which the land operations are taking place. The enemy will undoubtedly be forced to abandon any idea that may still be left to him of victory through economic air bombardment, and to turn to oppose the advance of the modern fast-moving mechanical armies advancing against him.

In the field, the bases and communications of our army overseas will no longer be safe from attack. The fighting troops in front of them cannot protect them against attack from the air and by mobile

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mechanical columns. Here, again, the rearward services must be prepared to protect themselves against these new attacks by dispersal, camouflage, and anti-aircraft fire, or the fighting impetus of their own troops in front will be crippled from the outset for want of food and ammunition.

The long periods of trench warfare in the last war, which were due almost entirely to the power of close-range rifle and machine-gun fire upon troops held up by impassable wire entanglements, came to an end with the advent of the tank. It appears to me that any long period of static warfare is now most unlikely. There will be times at which the casualties among the tanks—just as will be the case with aircraft—have been so heavy that there must be a lull for the replacement of casualties. And here let me say that one of the false impressions of the future which the trench warfare of 1915–16–17 has left with us, is the belief that at the commencement of the next great war we shall have the masses of material with which we finished the last. No nation, however belligerent, can afford to maintain much warlike material in peace. No system of subsidy to commercial life can assure the numbers of vehicles which it would like, nor the factories for the immediate supply of an ever-increasing number of aircraft and tanks. In my opinion the land forces of the future will be much smaller than they have been. For the moment I cannot picture any new weapon—even assuming that gas will be universally employed in war—which will bring back trench warfare. The armies of the future will be

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very largely mechanical, with tanks, armoured cars, tractor guns, and infantry in motors. They will be capable of great speed and endurance. They will have fighting vehicles which can move over any terrain, followed by a first line of transport which can move on the road at great speed and off it at a slower speed, the whole served finally by mechanical transport moving on the roads and carrying large loads at great speed. Such forces will be able to move fast both by day and by night, and night-marching generally will not be so tiring as it was to the infantry of old.

Mechanical inventions and improvements follow fast upon one another, and the nature of the next great struggle must be largely conjecture. We can but watch these inventions and sharpen our imaginations to ensure that we know what their effect is going to be upon the tactics of the men who employ them. Undoubtedly, the next great war will be won by the nation which knows best how to preserve its man-power by the use of machines. The odds seem to have turned very definitely in favour of the small highly trained army and against the half-trained horde.

Let me now consider small wars. It is in campaigns of this sort that the British Army is most likely to be engaged in the near future. They may be fought in the cold of a Russian winter, in the hills of the Indian frontier, or in the bush of West Africa. The causes leading to these campaigns have been most varied and in themselves have regulated to a certain degree the nature of the

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operations. They have been waged to punish the murderers of officers or officials on a frontier, to prevent a native despot from destroying his neighbours and devastating a whole country, to quell a rebellion or to settle a question of national supremacy in a country of mixed and antagonistic national elements. These have been the campaigns inseparable from the building and maintenance of an Empire. Their general characteristic has been that they start from small beginnings—many of them being checked at their inception by the bold action of some young officer in charge of an outpost detachment. Often, the Imperial troops on the spot have been in great inferiority and unable to deal with the situation themselves, and small disasters have occurred. Reinforcements have had to be sent, perhaps not best suited to the theatre of war in question, and the campaign has drifted into months and years. But now we have a vast experience of such warfare, and with the taming of so much of the wilder portions of the Empire we should be able to deal with any of the smaller cases which arise.

The most difficult and the most probable of all the small wars which may lie in the future for us are those against warlike nations, which, though not armed and equipped as are first-class Powers, are still stubborn fighters and well enough equipped to take full advantage of the terrain in their half-developed territories. We may have to effect landings in their territory from the sea, or we may have to wage war against them at some point where they border our Empire and far from the sea communica-

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tions upon which we depend. To you who know well the geography of our Empire I need not specify names more definitely. The undeveloped nature of these possible theatres of war is all against the highly trained troops with their complicated system of transport and the struggle is more against nature than against the enemy's troops.

Let me first take a landing in enemy territory. There is no operation of war which is so difficult as a landing from the sea against an enemy who is prepared to offer resistance. Navy, Army, and Air authorities have all to work together like one man. The Board of Trade, which supplies the ships in which an expedition travels, is at first the most important factor in the operations. Suitable ships have to be chosen and fitted up. The longer the journey the more the tonnage required for man and animal, for they soon deteriorate when cooped up too closely on board ship. For long journeys, over twice the tonnage for short journeys is required. If the enemy has anything of an air service, not only will surprise be difficult to achieve, for the enemy's reconnoitring machines cannot fail to detect large convoys, but the actual landing will be most hazardous. To attempt to establish an aerodrome ashore against an enemy with an air force is just as difficult as any other landing, for the enemy will not be hoodwinked into allowing you to get on equal terms with him as regards air before the main operations start. He will most certainly turn your preliminary landing into a main operation. Seaplanes, which might be used from some sheltered bay, thus avoid-

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ing all preliminary operations, have not the same performance as aeroplanes in the air, and are thus at a grave disadvantage in fighting with machines based on an aerodrome. Naval aircraft carriers have very distinct limitations when operating close to a coast-line, owing to the fact that they have to steam against the wind to take on their machines. Naval guns have flat trajectories and are not made for searching the rugged ravines on a mountainous coast. Projectiles which are good for piercing armour are not the best things to employ against troops in position in trenches. Signalling communications between the three services are difficult to arrange. Command and direction on shore require the highest courage, all concentrated together in some narrow place before a species of bridge-head has been pushed inland: the organisation of the beaches for the disembarkation of all paraphernalia of an army in the field. The whole operation requires minute previous calculation and reconnaissance and an actual rehearsal at some point other than the objective if that is possible. The whole administration of the operation should be thoroughly sound, and if there is any doubt about this such undertakings should be avoided like the pest.

Now let us take the question of a campaign on some outpost of Empire far from the sea base. The inhospitality of the country and the lack of communications put a limit upon the number of troops which can be employed at the front, and it is often possible to calculate beforehand the actual number of troops available for fighting. The longer

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the line of communications the greater the number of men required to maintain the few in front. The distance cannot be increased beyond the economic limit, for the animals and the mechanical vehicles eat up the very stores they are trying to take to the front. In many campaigns it is necessary to keep the majority of the fighting troops in the rear while depots of supplies are sent forward in advance under a minimum of protection. The Regular troops will seldom find themselves as mobile as their enemy in these wars. We must, therefore, see in how far modern mechanical vehicles can be employed. It would not be economical to ignore the local transport, however primitive, for it must be remembered that all mechanical vehicles will have to be brought by sea and shipping is not unlimited. It seems to me that the local means of transport will be used largely at first, being replaced by mechanical means as soon as it has been ascertained how feasible the change is. Modern mechanical vehicles can move easily over terrain which would have been considered impossible even two years ago, and one of the chief problems of the administration in one of these wars will be to decide in how far mechanical transport can be employed and how soon to send it out to the theatre of war. Still, there are theatres of war, such as North Persia and East Africa, where at certain seasons of the year—in snow and rain—mechanical transport cannot be employed. Even local transport can only be used at prohibitive expense in men and animals. I think that the only way to treat such conditions is to cease

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operations altogether and to prepare for better weather. The advantages of continuing are far outweighed by the losses incurred. Sickly seasons are the most fruitful cause of casualties. Campaigns must be begun in the right season and brought to an end as quickly as possible. Every man who enters the theatre of war is a potential casualty and an expense to the nation if he goes sick. Conditions in these campaigns are often very severe. In days of old they must have been wellnigh unendurable. One cannot think too much of the comfort of men and animals. Care will certainly be repaid in the end. In the rebellion in Mesopotamia in 1920–21 the men received a daily ration of ice in the hot weather. Far away from home the moral of the men falls rapidly if they do not receive their letters and parcels from home and the little luxuries, such as tobacco and cigarettes, which make life endurable. If the communications are cut off the effect is felt very soon. This was our experience in both North Russia and North Persia. I can imagine no greater raiser of moral than a loud-speaker giving out the results of football or racing at home after a long day's march, or perhaps some old ballad or song given by a well-known music-hall favourite.

There is nothing so important for the good of an expedition as clear instructions to its commander. Uncertain instructions lead to invertebrate war, which means delay and thus expense in lives. In small wars there is no place for indecision. Even though there is easy telegraphic communication with the commander in the field it is impossible to

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run a campaign from afar. Good instructions and a free hand in the execution of the task are essential. Operating in undeveloped countries, the commander in the field has often to take over much of the civil administration, and his military actions will be hampered if he has to be referring matters home.

Lastly, I come to the question of our Indian Empire. As you know, India maintains an army of her own, recruited from Indians and largely officered by white officers. She recruits her soldiers from the fighting races which form only a small proportion of the population. The number of white officers in the Indian regiments is very small and every effort is now being made to supplement them with good Indian officers. Then there is a British garrison, always maintained at a fixed proportion to the Indian Army. The troops, both British and Indian, are quartered all over the country in mixed Brigades and Divisions. Fighting in India on any important scale is limited to what is called Frontier fighting. It is of a particular nature, peculiarly exacting and carried out against an enemy whose men are individually of great courage and well armed. British units coming to India for the first time with young soldiers have to be acclimatised and then trained to this special kind of fighting. New units will not be of much value for at least a year after their arrival in India. Casualties will at first be heavy, for though one can teach war in theory it is difficult to do away with practice.

Taking small wars generally, certain definite

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principles can be laid down. The offensive is the only attitude to adopt against an enemy less well trained than yourself. To act on the defensive is to add to the number of your enemies, for there are always many sitters-on-the-gate amongst them. One can take liberties with such that one would never dream of taking against well-trained troops. Campaigns should not be begun hastily, nor should they be carried out slowly and in stages. Untrained enemies do not seem to take precautions until the danger is upon them. They are therefore easy to take by surprise. No warning should be given, and the campaign, once started, should be carried through without a halt in the most favourable season of the year. Finally, peace with whatever terms have been decided upon should be dictated in the field under the threat of the sword and preferably by the commander, whose prestige will be at its greatest height. To delay to negotiate is merely to allow the enemy time to forget his fear —and this he does rapidly—and to reorganise his forces. There is no more fruitful cause of long-drawn-out fighting and invertebrate war than the transference of peace negotiations from the field to some peaceful town remote from the scene of action.

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Sea, Land, and Air Strategy

The preceding papers, on sea and on land warfare, embody the views of leading authorities in their respective subjects, those views being supported throughout by past experience and by historical examples.

In the paper which follows, on Air Warfare, we find opinions held in the new Air Arm about the functions which air forces are likely to perform in future warfare. These opinions are based partly upon experience, partly upon prophecy.

It is interesting to note certain divergences between the airman's and the seaman's conception of strategical objectives, in-so-far as it affects, more especially, the need for battles to achieve a common purpose.

Editor.

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AIR WARFARE

BY AIR VICE-MARSHAL H. R. M. BROOKE-POPHAM

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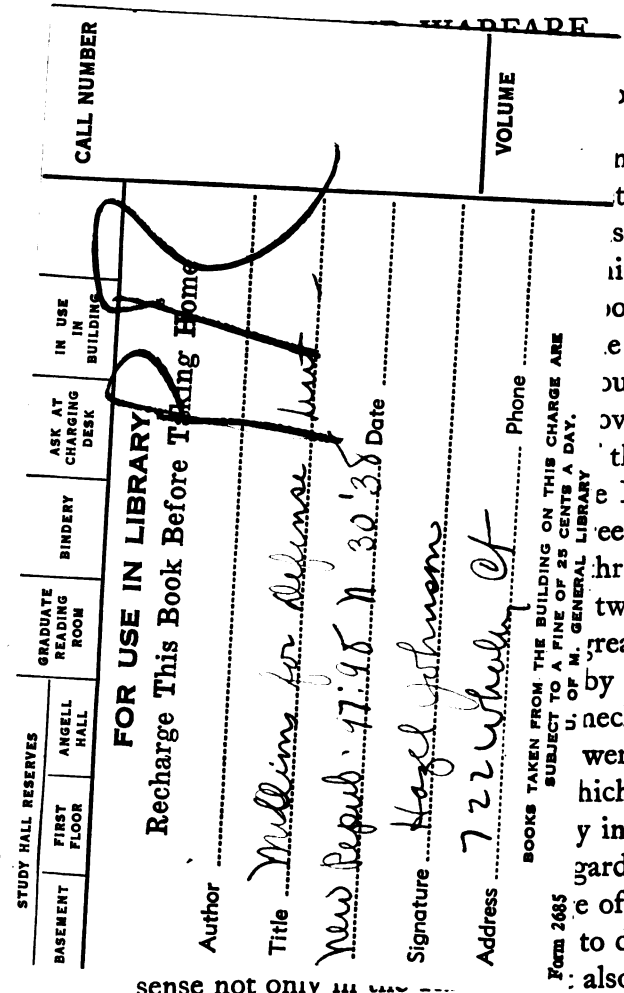

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AIR WARFARE

BY AIR VICE-MARSHAL H. R. M. BROOKE-POPHAM

AIR warfare might be taken to mean the methods of war in the air, *i.e.* of fighting between aircraft. I shall, however, hardly refer to this aspect at all, but shall deal with the broader meaning of air warfare—namely, the influence of air power upon the general conduct of a war ; and at the start I should like to emphasise this point. For countless generations man has been confined to movement in two dimensions, *i.e.* upon the surface of the land or the surface of the sea. It is only since December 19, 1903, *i.e.* within the last twenty-three years, that he has been able to fly, and so move in three dimensions, and his brain is still clogged with two dimensional instincts and traditions ; he has great difficulty in comprehending what is implied by his ability to move in three dimensions. His mechanical genius has outstripped his reasoning powers and he has produced machines the use of which he perceives but dimly. We are far off finality in the design of aeroplanes and engines, but as regards their proper use we are but touching the fringe of possibilities.

It is of the highest importance to develop the air sense not only in the R.A.F., but also in the nation as a whole ; for I would submit that it would be

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a great mistake to leave the responsibility for new ideas on this subject solely to airmen ; the air staff can say whether any suggestion is practicable or not, but in a sphere of activity so novel as this, I do feel that it is not only right but the duty of everybody to think over the subject and to make proposals. To suggest lines of thought is the main object of my lecture to-day.

Let us take first a few statistics regarding aircraft. Aeroplanes used for attack of enemy aircraft have speeds up to 150 m.p.h., can work at 25,000 feet and can climb to 15,000 feet in 11 minutes. This speed is not high enough and will have to be improved. Light bombers, carrying 500 lbs. of bombs, have speeds up to 150 m.p.h., and carry sufficient fuel to travel 250 miles and get back to their starting-point. Heavy bombers can take loads up to 2000 lbs., or with a reduced bomb load can go to a point 500 miles away and return. Aeroplanes can carry and launch torpedoes with an explosive charge as big as any torpedo carried on board ship. Aeroplanes can be transported in and operate from carrier ships.

Now let us consider for a few minutes some general points about war. Provided our requirement is of sufficient importance, we resort to compulsion when we cannot get what we want by persuasion. A nation may have to use force if it cannot get what it wants by diplomacy : in fact war is an act of violence whereby one nation seeks to impose its will upon another, in other words to break its opponent's will power.

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There was a period when the will power was that of one individual—namely, a King's ; at other periods, it was the will of a small body of individuals, powerful barons, a Cabinet and so forth, but this has now been changed by social and economic developments. Every individual in a nation is directly affected by war and at the same time his power to hinder or to stop a war has increased ; in fact no Government now can enter on or continue a war unless the majority of the people are in favour of such a course. It is the will of the people as a whole that continues or stops a war, and consequently it is the will power of the enemy people that must now be broken in order to win.

Before the advent of air power the chief means of bringing force to bear upon an enemy nation was through an army or a navy, the former acting ultimately by occupation of the enemy country, the latter by control of oversea communications. So we may now consider very briefly how an air force can assist the two other services.

To take a navy first. To gain complete control of sea communications necessitates destruction of the enemy's main fleet. In the past the chief difficulty has been not so much in defeating the enemy fleet as in bringing it to action ; this was mainly because a hostile fleet could avoid battle by taking refuge in a protected harbour. It is not extravagant to hope that by continuous attack with bombs and torpedoes, aircraft may in another war force the enemy fleet out of harbour, or else reduce it to impotence if it refuses to move.

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Once the enemy fleet is at sea it should be possible to keep it under constant observation, at any rate during daylight, by reconnaissance aeroplanes. It is possible that special reconnaissance detachments may be sent ahead of the main fleet, something on the lines of the independent cavalry used for strategic reconnaissance. These detachments might consist of one carrier and three or four cruisers, all of high speed and long endurance, which would have no protective duties. They would not be tied down to the fleet; they would be free to move in any direction. Once battle is joined, spotting the fall of shot is an obvious duty for the air.

As regards the direct action of aircraft against ships at sea, I will not embark on the vexed question of bomb *versus* battleship. There is, however, no doubt that aeroplanes will be able to damage any battleship and to reduce its speed. This fact gives the C.-in-C. of a superior fleet a valuable asset, when he is trying to catch up an enemy fleet in order to bring it to action. He can despatch torpedo and bombing aeroplanes off his carriers to concentrate their attack on one or perhaps two ships of the enemy fleet; this attack, it may be hoped, will reduce their speed by 10 per cent. to 20 per cent.; the enemy C.-in-C. is then faced with two alternatives, either he must abandon the damaged ships or else reduce the speed of his whole fleet and so be forced to give battle.

So far, it would appear that, on the whole, aircraft favour the stronger fleet, and so it may be

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hoped are an asset to this country, but there is another side to the question—namely, the direct attack by aircraft on merchant shipping. It is instructive to take a map of our ocean trade routes and to paint over it the areas within bombing range of foreign aircraft bases. This strip will be found to cover the greater portion of our trade routes at one point or another and is, of course, specially impressive in the Mediterranean. Time precludes any elaboration of this point, but enemy aircraft may in another war prove as great a danger to our shipping as did submarines in the last.

To turn now to aircraft assisting an army. There is no need to refer to simple co-operation by means of reconnaissance and observation of gunfire. These were highly developed in the last war, but there are other means of assistance which are likely to become more evident in the next war than in the last. Let us, however, remember that if we paralyse the brain, the body is useless. It is the brain of the enemy army, namely its commander and his system of command, including the means of intercommunication, that forms the most important objective during any battle. One may recall the effect in the South African War of the Boers concentrating their fire on our officers. Going somewhat further back, one may quote the King of Syria's instruction to his thirty-two Captains before the battle of Ramoth Gilead: 'Fight neither with small nor great, save only with the King of Israel.' Hitherto the enemy's system of command has been well if not fully protected, but aircraft provide the means

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for attacking it direct. It may be dislocated either by attacks on the Headquarters itself, or, perhaps even more effectually, by destroying the means of communication to and from these Headquarters. The effect of this better method was brought out very clearly in Allenby's great victory in Palestine in September 1918. You may remember that the Turkish General Headquarters were at Nazareth, Headquarters of the Seventh Army at Nablus and of the Eighth Army at Tulkeran. All the communications from Nazareth southwards passed through a place called Afule, and those northwards through Deraa. On September 17 and 18 attacks were carried out by a day bombing squadron on Deraa. It was subsequently found that these attacks had cut the wires leading from the Turkish G.H.Q., back along their line of communications. On the night before the battle, September 18–19, Afule was bombed by a Handley-Page. Bombs were dropped from a low altitude, and when our cavalry got to Afule later they found bomb craters filled with the broken ends of practically all the telegraph and telephone wires leading from Turkish G.H.Q. to the front. Just before dawn on September 19, other aeroplanes went out and attacked Tulkeran and Nablus, and it is known that at Nablus at any rate the Signals Office was hit by a bomb and blown to pieces. The result of this was that the Turkish Headquarters were in almost entire ignorance of what was happening at the front. As one evidence of this on September 20 a German aeroplane for Rayak with all the mail for Turkish G.H.Q.

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landed at Afule when that place had been in possession of our cavalry for some hours.

Then the army of to-day requires a vast amount of material, food, ammunition, etc., brought up to the front continuously. Remember that during the three days September 27–29, 1918, the British army fired away 65,000 tons of ammunition. Stop this supply and an army cannot fight or even exist. Aircraft may not be able to effect a complete stoppage on the enemy lines of communication, but they should be able to cause much delay and generally impede the supply to such an extent that the enemy army will be unable to face a battle ; it may have to retire on the mere threat of attack because it knows that it cannot rely on getting ammunition up in sufficient quantity to sustain a prolonged engagement. In fact, given favourable conditions one may see an army advance to occupy ground that has been gained by the action of aircraft.

Now how can an air force be used by itself to bring pressure to bear upon an enemy people ? It is by attacking such targets as will most affect the enemy's will and power to continue the war, in fact, what one may term the enemy's vital centres. Attacks may be made on large towns with the deliberate object of terrorising the inhabitants. But this method is attended by certain disadvantages, of which the ultimate moral effect on the attacking nation itself is not the least. Perhaps, on the analogy of the attack on the system of command of an army, the main objective should be the centre of government; for deprive a nation of its controlling brain,

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and the conduct of war becomes impossible. Or we may attack the centres of transportation, supply, water or lighting systems, in fact, such targets as are most essential to the normal life of the enemy people ; if we can bring about a continued dislocation of that normal life, their position will become so intolerable that the people will submit to any conditions of peace.

A most important point to bear in mind is that these attacks may commence simultaneously with a declaration of war. It is impossible to lay down definitely before a war what are the vital centres to be attacked ; it depends on many factors : the *moral* of the opposing people, their habits and mode of life, the time of year. The nature of the vital centres will be decided by the Government in accordance with the general policy for the conduct of the war. If, for instance, the Government decide that the most effective method of bringing pressure to bear upon the enemy people is by destroying their fleet, then the enemy naval dockyards and bases would become the vital centres.

This leads to another problem. An army cannot proceed to occupy enemy territory until it has disposed of the hostile army, a navy cannot effectively control sea communications until it has disposed of the enemy navy. Will an air force have to follow the same principle and dispose of the enemy air force before it can proceed to attack the enemy vital centres ? The answer is that it will not.

To begin with, there is nothing in air fighting corresponding with a defensive attitude in land

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fighting, where the defender takes up a position in which he is able to compel the attacker to fight or else abandon his object. An air force cannot entrench itself behind barbed wire to protect a vital area, because the attacker can move in three dimensions ; it cannot take up a waiting position on the flank of an enemy's line of advance, because the attacker may approach from any direction. Then, difficult as it has been in the past to bring an enemy fleet to action, it is still more difficult to bring an enemy air force to action ; he cannot be compelled to take the air at the moment we want, and we cannot remain indefinitely over his aerodromes because of the limitations of petrol capacity. In fact, fighting in the air on a large scale only takes place by accident or by mutual consent.

Again, air fighting is in its nature indecisive. We can hardly ever hope to destroy an enemy's air force, we can never ensure a permanent command of the air ; all that we can do is to obtain a local and temporary superiority. There will be much fighting in the air, there will usually be a continuous struggle for this local superiority, but there will be nothing corresponding to the Straits of Tsushima or to Sedan.

Finally, we must remember what our object really is. It is to bring such pressure to bear upon the enemy people that they will force their Government to sue for peace. Defeat of the enemy air force, even if it were possible, will not in itself contribute much towards this pressure, nothing corresponding to a decisive victory over the enemy's army. The

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ordinary man, accustomed as he is to movement only on the surface of the land, may see a dozen of his country's machines brought down in flames, but all he thinks is : ' Dear me, I wonder if that hurts.' He may hear that one of the aerodromes of his bombing squadrons has been badly damaged, but he will not be overcome with despair because he knows that fewer bombers will go over and attack the enemy country that night. What does affect him is the fact that Waterloo Station has been destroyed, so that he cannot get home, that his club can give him no dinner because the water supply is cut, and that the town is in darkness because the power station is ruined.

Fighting in the air can never be an end in itself ; it is never more than a means to an end. Since we can, we therefore must proceed direct towards this end—namely, the attack of the enemy vital centres whatever those centres may be.

As has already been indicated, adequate defence against air attack is a very difficult matter. Apart from the power of the attacker to approach from any direction and at any height, it must be remembered that each air attack on a locality lasts but a very few minutes and that aeroplanes travel very rapidly, consequently warnings are short ; also that the attackers will often be able to gain advantage of wind, cloud or sun. Improvements are being made in anti-aircraft guns and gunnery, but the best means of defence against hostile air attack is still our own aircraft, and even these form an uncertain means.

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It is still a moot point whether defending aeroplanes should be up in the air, waiting for the enemy to come, or whether they should remain on the ground ready to go up as soon as information is received. If the former, it must be remembered that the single-seater fighter only carries sufficient petrol for about two and a half hours ; consequently, if the defender keeps his machines in the air waiting for the enemy, the latter may not arrive until the defending machines are forced to descend for want of petrol. If the defender keeps his machines on the ground, it is questionable whether they will get off and up to the required height in time.

A squadron of aeroplanes cannot yet get off merely on the pressure of a button. Pilots have to get dressed, for they cannot remain continuously in their heavy flying clothing. Then they have to get into their machines, engines have to be started and run up, instructions have to be issued, if not to each individual pilot, at any rate to each Flight Commander. Further, it must be remembered that it is far more difficult to pick up aeroplanes in the air than it is on the ground. During the last war, we relied very largely on the bursting of the first A.A. shell to show us where to look for enemy machines. This is all right provided the enemy are in view by ground observers, but if they go above clouds and rely upon dead reckoning or wireless for reaching their objective, as is quite practicable nowadays, the problem becomes much more difficult.

It is evident then that aeroplanes are mainly means of offence, and the maxim that attack is the best

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means of defence applies with even greater force to air warfare than to sea or land warfare.

So far I have dealt with generalities. Now let us apply these to the particular problems of the British Empire. There was a time when this country was exposed to danger of invasion and adopted extensive measures of protection. Invasion by an enemy army is hardly within the bounds of possibility to-day, but we are exposed to another form of attack—from the air. Not a few desultory raids, but a determined continuous series of heavy attacks—attacks that can be delivered straight against the brain and heart of the Empire and that may in themselves form the declaration of war.

London is badly situated in this respect. From the air point of view it is very close to the coast, so that the amount of warning that will be given of the approach of enemy aircraft will be small. The time available for a squadron to find and to stop the enemy, from the moment that it receives its orders, will not be more than twenty to thirty minutes. Without in the least wishing to draw a harrowing picture, I would bring to your recollection these facts : During the last war, enemy aeroplanes dropped a total weight of about 30 tons of bombs on London, and the casualties were 432 killed, 1448 wounded ; but it is quite possible that three or four times this weight of bombs may be dropped every twenty-four hours in another war unless our defences are adequate and efficient.

Reference has already been made to the subject of the added danger to our merchant shipping. So

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much for the gloomy side of the picture. On the other side we find that aircraft offer wonderful potentialities for defence of our Empire and of the territories for which we are responsible. Certain parts of the Empire, *e.g.* Australia, must at any rate consider the possibility of an overseas invasion. Aircraft form a most effective means of defence against this. The invading force can be attacked whilst still many miles out to sea, and though warships may float after air attack, transports will not. During the process of debarkation, ships at anchor and men in open boats afford easy targets. In fact it is now generally admitted that landing on a hostile coast in face of air opposition is impracticable. Aircraft should then in many cases be able to effect a large saving of expenditure on coast defences.

And there is a further point to remember. A couple of 15-inch guns mounted for coast defence must have a considerable deterrent effect on a potential attacker, but these guns are fixed and immobile. They represent a very large capital expenditure on immobile material which can be used for no other purpose and may never be required at all. This expenditure includes not only the guns themselves and their mountings, but all ferro-concrete and armour work necessary, expensive range-finding and firing installations, communications, magazines and stores of ammunition.

Substitute aeroplanes for guns, and we not only have the means of attacking the hypothetical invader at a vastly greater range, but we can use these aircraft for other purposes. A squadron at,

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say, Singapore may be sent to prevent trouble on the North-West Frontier of India, and if the situation in the Far East becomes serious, could be moved back to Singapore at short notice.

Then aircraft form a most economical and effective method for the control of an uncivilised or semi-civilised country, mainly because they can act with great rapidity from a secure base, without the need for any lines of communication from that base to the place of action. It is this rapidity that forms their greatest asset, because they are able to nip trouble in the bud, to crush a riot before it develops into insurrection. One could quote many instances, *e.g.* the disturbances on May 4, 1924, at Kirkuk in Iraq : 66 officers and other ranks were conveyed 150 miles by air within eight hours of the first news of trouble reaching Bagdad. Without air power the movement would have taken at least five days, and it would be very rash to put any limit to the extent to which the disturbances might have spread in those five days. By the prevention of small wars, aircraft have undoubtedly saved this country hundreds of lives and millions of pounds since 1918. In this connection I may point out that in 1922 the garrison of Iraq cost 22 millions, in 1925 it cost four millions.

When some form of small war is necessary, aircraft form a very economical and humane means of carrying it out. In the spring of 1925 an expedition using aeroplanes alone was carried out against recalcitrant tribes in Waziristan. The cost of the expedition was £76,000 ; the casualties

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two killed of ours and 11 killed and wounded of the enemy. Very few casualties, but all the tribes surrendered and agreed to all the conditions laid down. In 1921 the war costs of operations by army troops in Waziristan cost £456,000 a month.

Similarly, aircraft are most valuable for the maintenance of internal order. In this connection, I may draw your attention to a statement by the South African representative during the recent Imperial Conference, where he said that, with the aerodromes now available, their one squadron at Pretoria could operate at any point in the Union of South Africa within one day.

It would manifestly be expensive to keep enough aeroplane squadrons to meet all possible eventualities in any part of the world, and there is no necessity to do so. Aircraft are very mobile provided they can fly; aeroplanes have already flown to every part of the British Empire in the Eastern Hemisphere, and all that remains is to develop these Imperial air routes that have already been blazed. Consider the value of such an air route from Cairo through Palestine and Iraq to India and on via Burma to Singapore and Australia. What possibilities it gives for rapid concentration at any threatened or troublesome spot; what a deterrent effect such power of concentration would have against a potential enemy!

With another route from Cairo to the Cape, with a branch to Nigeria, the problem of Imperial defence and control assumes another aspect. But to gain value from such routes we must never look upon

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aeroplane squadrons as fixed garrisons but as mobile units, like a fleet located normally in some area but ready to move to any point.

The possibility of doing this is not a dream. It is approaching realisation. Cobham's exploits are fresh in your memory, but I may remind you that a flight of service aeroplanes recently flew from Cairo to the Cape and back to England, that another flew from Cairo to Kano in Nigeria and then back again, accomplishing in six days a journey that normally takes six months ; also that French aeroplanes have flown from Paris to Jask in Persia, 3390 miles, in 32 hours, and from Paris to Omsk in Siberia, 2947 miles, in 29 hours, in both cases without a stop. In America there is a regular air mail service between New York and San Francisco which covers 2700 miles in 34 hours going westwards and 29½ hours going eastwards. The train takes over four days.

I agree that some of these figures I have quoted are for special aeroplanes and are in the nature of records ; but you must remember that the record of a few years ago becomes the normal performance of to-day. In support of this statement I should like to say that recently I came across some notes that I prepared for a lecture that I gave in 1914. There I gave some recent records. That for speed was 127 miles per hour and for distance non-stop 1056 miles. If you remember what I said earlier in the lecture, you will see that we have light bombers of to-day that will travel considerably faster with all their military equipment than the record

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machine of 1914, and heavy bombers that equal the record distance of 1914. In passing, I may remark that during the last twelve years the record for speed has doubled and the record for distance has trebled.

I think that anyone who keeps his eyes open cannot fail to realise what an important part roads must have played in the founding and maintenance of the Roman Empire. I feel that the analogy for our own greater Empire is to be found in air routes. And as in the case of a road it is no good merely marking out the alignment or even constructing the road and leaving it, so air routes must be kept up and in constant use, to some extent by military aircraft, but mainly I hope by civil or commercial aircraft.

I cannot emphasise too strongly the importance of this factor of mobility with regard to aircraft. Mobility not only because they can be moved quickly from one part of the world to another, but because the same machines can be utilised for so many different purposes, whether it be over the sea or over the land. Coast defence aeroplanes can operate almost as efficiently on the N.W. Frontier of India or in the plains of Iraq as in the Straits of Malacca. Further, there are often many different ways whereby aircraft can achieve the object of the Commander. To take an instance, suppose the C.-in-C. of an army wishes to stop the supply of gas shells reaching the enemy front. The Commander may send his aeroplanes over to attack the chemical factory that makes the gas, the station where the shells are filled, the ammunition dumps

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where the shells are stored or the railways and roads that bring those shells up to the guns. Several different targets, but all leading to the same end. Some of you may remember Marshal Foch's remark : 'We make the mistake of our lives if we think that the spade can defeat the enemy who is trained to manœuvre.'

His meaning was, of course, that mobility is one, if not the most important, factor in modern war, and his saying can be enlarged and carried into a higher sphere when we come to consider the mobility and ubiquity of aircraft.

May I now suggest another point, with regard to economy effected by the use of aircraft? Complaints are often made of the numbers of men required to keep each aeroplane at the front (parenthetically I may remark that in France the number was no more than required to keep a field gun, but no matter). The line of argument seems to be : 'Of 100 individuals in the R.A.F., only three or four are fighting—what a waste of manpower! Only 4 per cent. can get killed ; we are not getting value for our money.' Surely the argument is diametrically wrong. We don't want to kill off our young men in war, we want to keep them for the peace which is beyond war. By the use of aircraft we are substituting machinery for flesh and blood ; instead of exposing one-third of our serving men to steel, lead, and gas, we are exposing but one twenty-fifth. Surely, provided we attain our end, the fewer men we expose to risk of wounds and death the better. War machinery of all kinds

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should not be regarded as wasting a large number of men in maintenance but as effecting a vast economy in the utilisation of available man-power.

Perhaps I may indicate here some of the difficulties that face a pilot, especially the pilot of a single-seater fighter. He is not sitting in a comfortable chair in a warm room, *i.e.* under conditions favourable for calm thought. His seat is very cramped and he can hardly move. He is probably at a height where the atmospheric pressure is half what it is on the ground and the temperature is perhaps as low as minus 30° C., say, 54° of frost on the Fahrenheit scale. If he puts his head out he is met by a blast of wind coming at a speed of 120 miles an hour or more. If he touches any metal with his bare flesh he will get frostbitten. He has a great many things to think about. Besides his machine and his engine, he has two guns to operate, and one or both of these may jam and require attention at a critical moment. He has to look after his oxygen apparatus, his electric heaters for himself, his goggles and his guns, probably also radio telephony, and he has to keep a note of where he is, whilst travelling at a rate of two miles a minute. Anything that he has to do must be done very quickly ; for instance, if he is approaching an enemy machine head on and they start 500 yards apart, they will collide in a little over four seconds unless one of them alters course.

Without wishing in any way to claim that pilots in the Royal Air Force are supermen, I think you will agree that the work requires men with some-

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what peculiar characteristics, rather different from those of the average individual ; I am quite certain that there will always be plenty of people in the Empire possessing these characteristics.

I referred, at the commencement of my lecture, to the difficulty of thinking in terms of three dimensions and thus of getting full value from the use of air power. I would again emphasise the necessity for developing what I may term the air sense of the nation. We are not taking kindly to the air as a people. America has over 2000 privately owned aeroplanes, we about two dozen. Very few people make use of the air for themselves, their letters or their goods. Some, still back in the neolithic age, may not see any value in aircraft or any danger ; for those who do, I would suggest losing no opportunity for getting into touch with the air, for thinking in terms, not of two dimensions at twelve miles a day, but of three dimensions at two miles a minute. There are commercial aeroplanes wanting loads, aeroplane clubs wanting members, reserve squadrons wanting encouragement.

Finally, I hope that no one will go away with the impression that in the Royal Air Force we think that air power alone can solve all the problems of Empire defence. That is not so. Our work is to think out how the use of air power can enable this Empire to fulfil its responsibilities more efficiently than before, but there will still be many functions that can only be carried out by a navy, others by an army, and still more that can only be carried out by a combination of the efforts of all

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three. And this seems to me to lead up to perhaps the biggest problem of all, how best to combine the potentialities of all three in another great war, how to draw the most value from, say, the resisting power of an army, the mobility of a navy, and the striking power of an air force. After the South African War the British Army started to think out the best way of combining the activities of the three arms—cavalry, artillery, and infantry. Now the country has a bigger problem of how to combine the three services.

Even that is not enough ; it must think out how to bring in the effects of financial pressure, of propaganda, and of all the other activities that can be utilised to bring the war to a favourable conclusion as rapidly and as economically as possible.

Remember that unless we are ready to solve this problem satisfactorily, unless we are ready to make use of all the latest scientific and mechanical developments, we are merely encouraging attack from some ambitious and more efficient nation.

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The Need for Co-ordination

The foregoing dissertations on warfare from its sea, land and air aspects should suffice to prove to 'statesmen and citizens' that it is essential to co-ordinate the activities of sea, land and air forces in order to obtain the best value from each service.

We are governed, as Lord Grey pointed out in his introductory address, by civilians and not by members of the fighting forces. Upon civilian statesmen, therefore, the responsibility must fall for this co-ordination.

Chemical warfare, dealt with in the next paper, affects the operations of all three services. It also affects the civilian population in a pre-eminent degree. The expert information which is provided will, it is hoped, remove many popular misconceptions.

Editor.

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CHEMICAL WARFARE

BY BRIGADIER-GENERAL H. HARTLEY

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It can be said without fear of contradiction that there is no military subject on which opinions have been influenced so much by ignorance, misunderstanding and prejudice as chemical warfare, and its position to-day is so anomalous that its discussion is a rather delicate task. Any future war must be national in character; gas is known to be an effective weapon, easily and cheaply manufactured in industrial plants, and offering great opportunities of surprise. Sooner or later will not some nation fighting for its existence demand the use of everything in its power to gain its end, despite any previous agreements? And if some excuse were needed, it would not be difficult to find one under the conditions of war psychology, so long as high explosive shell are used, each of which emits on burst a considerable volume of a toxic gas—carbon monoxide. Smoke screens too may be a fruitful source of misunderstanding. The same forces which may produce war will lead to the employment of gas.

The present position seems to me to emphasise the dangers which may arise from attempts to limit

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the application of scientific developments to war by international conventions. It is impossible to foresee what may be the relation of some general formula to future discoveries, or what differences of interpretation may arise respecting it : its mere existence may arouse suspicion and be a contributory cause of war : there can be no guarantee that it will be observed, while reliance on it may imperil national safety again as it did at Ypres on April 22, 1915.

The supposition that gas would be more cruel than other weapons has proved notoriously false. Except in the first few weeks, when it was used against unprotected troops, the proportion of casualties who died or were permanently injured was far less with gas than with other weapons. During the last sixteen months of the war the death rate among our own gas casualties was 2·6 per cent., while for other casualties it was at least 25 per cent. Many casualties were caused by the effect of mustard gas on the eyes, yet only ten cases were recorded of persistent impairment of vision and four which resulted in the loss of an eye. It is now generally admitted that many military objects can be attained with less suffering by using gas than by other means. But is it really of any value to discuss whether some new weapon such as gas is more or less humane than, let us say, the tank, which, to quote the terse but expressive words of Field Service Regulations, 'may be used to destroy hostile weapons and personnel by passing over them' ?

If we recall how near civilisation came to a catastrophe as a result direct and indirect of the

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exhaustion due to the last war, there is little encouragement to do anything that may tend to lengthen some future struggle. On Christmas Day of 1621, Donne, preaching in St. Paul's Cathedral, used these words : 'So by the benefit of this light of reason, they have found out Artillery, by which warres come to quicker ends than heretofore, and the great expence of bloud is avoyded : for the numbers of men slain now, since the invention of Artillery, are much lesse than before, when the sword was the executioner.' 'By which warres come to quicker ends than heretofore'—this will not result from restricting the application of science to war, even if it were possible. When war can be made archaic, there will be nothing to fear from it.

Assuming then, as we must for my purpose, that 'if we have war, we shall have gas,' we find that some recent writers have predicted the most alarming effects that will be obtained by it. All such claims need the most careful analysis, for nothing is harder than to estimate the real value of a new weapon in peace-time and to assess its tactical possibilities and the possible development of protection against it.

In attempting to forecast the future of chemical warfare the most valuable evidence we have is our experience of gas during the last war, and while admitting the danger of basing a general forecast on the particular conditions existing in 1914–18, that experience will at any rate allow us to discover the characteristics which distinguish gas from other weapons and the factors which determine its success.

No nation entered the war prepared to use gas

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or equipped with any defence against it. The German chemical works were not even included in their mobilisation scheme, and it was not until they were faced by the failure of their initial offensive, by shortage of high explosive, and the stalemate of trench warfare, that they sought in gas a new weapon that would both strengthen the preparation for an infantry attack and augment their supplies of ammunition. Gas shell containing an irritant substance were actually used without effect in October 1914 at Neuve Chapelle, but the first serious gas attack was a cloud discharge from cylinders of chlorine, the only gas quickly available in large quantities, at Ypres on April 22, 1915. Coming as a complete surprise against unprotected troops, it should have given a decisive advantage if carried out on a sufficient scale. However, the weakness of this type of attack—its dependence on weather conditions—was exposed at the start: lack of favourable winds caused successive postponements for seven days, staffs and troops lost confidence in the experiment, the attack when it came was carried out in a half-hearted way late in the afternoon, and the opportunity of a decisive stroke was lost. Subsequent experience of a similar kind, casualties due to change of wind during a discharge, and the rapid provision of respirators by the Allies, soon led to the abandonment of cylinder discharges in conjunction with an infantry attack, and while they were retained for harassing purposes, attention was turned to the use of gas in shell, which made it a more flexible weapon, less

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dependent on weather conditions. Gas shell, however, achieved but one success in 1915, mainly because they were used in insufficient quantity, and by the end of the year little importance was attached to them in the German armies. The next surprise came from the French in the form of a field gas shell with a small bursting charge just sufficient to open it, containing phosgene, a volatile lethal substance. The success of this shell in the defence of Verdun in the spring of 1916 gave a fresh impulse to the development of gas projectiles, but it was not until 1917 that supplies were large enough to make gas a serious factor in the situation.

Meanwhile, defence had been steadily progressing and the reaction of protection on tactics was shown clearly by the German decision to give up cloud gas attacks on the British front after August 1916, when our troops were first equipped with box respirators, since their own experience had taught them that a force so equipped had little to fear from an attack of this type. But equipment without training was no guarantee of safety. Before the British offensive at Arras in April 1917 no gas was used for several months until the artillery preparation for the attack, when a large quantity of lachrymatory shell were fired on roads and batteries during the night before the attack, and the Germans, unaccustomed to wearing respirators at night, were severely handicapped : in fact the German Army Commander wrote in his report ' Artillery activity seems to have been paralysed by the effect of the gas.' This is an excellent example of the value of a

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harmless lachrymatory substance against ill-trained troops.

From April onwards large quantities of gas shell were used on both sides in all operations, but the efficiency of the respirators and the improving gas discipline of the troops made gas a less effective weapon, until in July 1917 the Germans introduced mustard gas, which did not advertise its presence so well as gases of the lachrymatory or phosgene type. Being a liquid at ordinary temperature, with a low vapour pressure and remarkable stability, it could remain on the ground for long periods slowly giving off vapour, which had a slight smell but produced no immediate effects to suggest its dangerous nature. Nevertheless in very low concentrations it could affect the lungs or eyes, producing casualties some hours after exposure, while contact of the liquid with the skin produced painful and slow-healing burns. It was the insidious nature of this new agent, coupled with its persistence and its many-sided action, that made it so formidable, and it was responsible for the majority of the gas casualties of the war. Its tactical value depended mainly on its persistence, as it could be used to render areas untenable, such as Bourlon Wood in November 1917 or Armentières in April 1918, except at the cost of very heavy casualties, such as we suffered in the Cambrai Salient in March 1918. The properties of mustard gas made it unsuitable for use on a battle front except as a defensive weapon, and in 1918, as in 1915, the Germans were looking to gas to assist their offensive.

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The futility of the protracted preliminary bombardments of 1916, which made the ground almost impassable and removed any possibility of surprise, had become obvious in 1917. Our solution of the problem was the tank. The Germans tried to solve it by means of a hurricane bombardment without previous registration, in which they relied on gas shell to silence the hostile artillery, as they could not be certain of accomplishing this in so short a time with high explosive and shrapnel. These tactics were developed on the Russian Front in 1917, an attack in Eastern Galicia on July 19 being the first occasion when registration was omitted, the bombardment opening before dawn in order to secure the maximum gas effect.

In the German offensive on the Western Front in 1918 several million rounds of gas shell were fired in the preliminary bombardments ; for counter battery work as much as 80 per cent. of the shell contained gas, and for other tasks 50 per cent. There is ample evidence that the Germans relied considerably on the use of gas in their attacks, and in general it appears to have accomplished its immediate object so long as the weather was favourable. It is significant that on July 15, the day of the German failure at Rheims, the wind was blowing towards the German lines. But despite the uncertainty arising from weather conditions, gas had proved so useful a weapon that by the end of the war 25 per cent. was the normal proportion of gas ammunition in all the armies. Thus in a short time gas had developed into an effective weapon

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which had to be reckoned with in almost every situation.

During the last sixteen months of the war it was responsible for 14 per cent. of the British and for 28 per cent. of the American casualties, but the tactical advantages gained by its use were of even greater significance. Chief among them were the neutralisation of artillery, interference with movement, hampering of communication, and the possibility of compelling the evacuation of a position by means of a persistent gas.

It must be recognised that these successes were gained under exceptional conditions which may never occur again. In the last war everything was of the nature of a set-piece, positions were accurately located and were usually held for long periods, so that it was possible to bring up large quantities of gas ammunition and use them effectively. And it soon became obvious that the bigger the area covered by a gas bombardment the greater was its effect, as in big contaminated areas defence by tactical means was impossible and men had to remain in the gas. On the other hand, in 1917 and 1918 these successes were gained against troops who were thoroughly trained and experienced in gas defence ; how good their discipline was is proved by the enormous increase in the number and gravity of casualties when precautions were neglected. Safety depended mainly on a trained nose and individual initiative, and in 1918 it might almost have been said of our men, as of the hounds in ' Reynard the Fox '—

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Their noses exquisitely wise,
Their minds being memories of smells;

a standard of defence which it will not be easy to maintain in peace-time.

What now are the special characteristics of gas which differentiate it from other weapons? First there is its peculiar relation to gas defence. The modern respirator gives complete protection to the eyes and lungs, and it can be worn for long periods with a comparatively small reduction of fighting efficiency, although it must be removed to eat or drink. Protection of the skin against mustard gas is a more difficult problem, as protective clothing is less efficient than a respirator and is a considerable handicap. Experience shows that the effects obtainable with gas will always depend enormously on the protective appliances and gas discipline of an opponent; if these are defective its effect may always be overwhelming.

Gas is the only weapon that can produce continuous effects in both time and space. There need be no gaps in a gas cloud as in a barrage, and a persistent substance such as mustard gas will lie on the ground giving off toxic vapour for some time. The effects on personnel of a high explosive bombardment practically cease with the shelling, while after a heavy mustard gas bombardment respirators must be worn continuously for days, and there is always the risk of contact with the liquid, which invariably produces a casualty owing to blistering. Many effects can be obtained with persistent substances which are unthinkable by any other methods.

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Then gas is less rigid in its trajectory than other projectiles ; it will sink into trenches and dug-outs, it will drift with the wind over a target and give results which would otherwise be obtained only with a direct hit, hence its value when a target is not definitely located. You may remember that in 'The War of the Worlds,' written nearly thirty years ago, when the Martians could not see a battery to destroy it with a Heat Ray, they discharged the black smoke which killed everything under cover, and when it had done its work was cleared by jets of steam. A remarkable anticipation even for Mr. H. G. Wells.

Again, gas is more subtle in its nature than other missile weapons ; a wide range of substances may be used with properties specially suited to particular tactical purposes, and there is always the possibility of surprise offered by the discovery of a new compound.

It is difficult to compare the effect of gas on *moral* with that of other weapons, but it is unquestionable that the ill-understood danger, the constant strain of watchfulness, the fear of new gases with more painful properties, and even the feeling of confinement when wearing a respirator must tend to weaken the spirit of a force, especially if it has had little experience of gas.

Like all weapons gas has its limitations, and these are often not sufficiently realised. For every gas there is a minimum effective concentration, and unless this is attained its employment is of little or no value. Lachrymators will put the eye out of

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action in a few seconds at a concentration of one part in 2 to 5 million of air ; mustard gas will cause eye or lung casualties after an exposure for an hour to one part in a million of air ; phosgene will produce a casualty after an exposure of one or two minutes to a concentration of one part in fifty thousand. These concentrations may seem very small, but an immense quantity of gas is needed to produce them even momentarily over an area of one square mile. A recent French article [1] contains a calculation of the weight of a non-persistent gas like phosgene necessary to produce a lethal atmosphere over the whole of Paris. The result is 800 tons, which it is said could be dropped in gas bombs by a fleet of a thousand aeroplanes making two journeys in a night, supposing that the bombs contained 33 per cent. of their weight of gas. But this calculation neglects entirely the fact that the liberation of gas would be spread over many hours, and that as each bomb burst its contents, except on a perfectly still night, would quickly be dispersed by the wind. Obviously for such a purpose a persistent gas would be more economical and effective, and on the basis of a recent German calculation [2] it would require 25 tons of mustard gas to contaminate one square mile effectively, while exactly the same weight of phosgene would be required to produce a lethal concentration over this area, which would rapidly be dispersed by the wind.

The speed of the wind and the state of the atmo-

[1] *Les Ailes*, Paris, Oct. 8, 1925.

[2] Hanslian, *Wissen und Wehr*, 1926, drittes Heft, p. 129.

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sphere have an enormous effect on the concentration obtained by the use of a given amount of gas. No weapon is influenced to anything like the same extent by weather conditions. With wind velocities of over twelve miles per hour the dispersal of gas is so rapid that the effect of gas shell will be almost negligible except with lachrymators or other persistent gases, and even with these there will be a great decrease in efficiency. Hence there must always be considerable uncertainty attaching to its employment in any operation, and meteorological forecasts will play an important part in gas tactics.

Bearing in mind these characteristics, what part is gas likely to play in future wars? The answer depends on the extent to which gas is likely to supplement other weapons, and the economy and certainty with which tactical objects may be attained by its employment. Obviously this involves assumptions as to the evolution of war and the possible developments of gas and other weapons. There is no lack of prophets, and on the whole the experts, who realise more clearly the difficulties and limitations involved, and from their familiarity perhaps pay too little heed to the influence of gas on *moral*, make more modest claims than other writers who contend that gas will be the most powerful weapon of the future. Used at the right place and moment and in adequate amount it offers brilliant possibilities, but theoretical victories might well be won with other weapons on the same assumptions. Comparisons of the numbers of machine-gun bullets and of gas molecules are picturesque but misleading.

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From the scientific side it is necessary to consider the possibility of fresh substances being discovered with new or vastly increased toxic properties, and of their employment in so much more effective a manner as to alter the complexion of gas warfare and upset completely the balance between defensive and offensive power. Here prophecy is perhaps somewhat rash. But if we consider the enormous number of compounds synthesised by chemists, comparatively few have properties which make them of use in war, and the most effective of these of each type do not differ greatly as regards the concentrations at which they become dangerous, so that we have some reason for agreeing with Senator Paternò[1] that it is unlikely that new substances of much greater military value than those we know to-day will be discovered.

As regards improved methods of employment, although chemical warfare is a recent development, intensive work has been done on existing methods of producing concentrations of gas in the field, so that while such weapons as the gas shell and bomb will undoubtedly be improved, their factor of efficiency will not be multiplied many fold, and on the weapon side the effectiveness of gas may be increased more by its use in aircraft and tanks than by the improvement of older methods. Naturally gas may and will produce many surprises, but it must not be assumed that because of its novelty it will be capable of spectacular development.

[1] Report of the Temporary Mixed Commission for the Reduction of Armaments, September, 1926.

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It is probably a safe assumption that the two factors most likely to influence land tactics in the future are the development of aircraft and of mechanical transport; the latter will make for quicker movement not limited to roads or railways, and safety from both will lie in mobility, dispersion, and concealment, all of which will make the use of gas more difficult. In fact the encounter battle of the future may offer few opportunities for its employment.

Looking forward to the ultimate mechanisation of land forces, and the concentration of fighting power in fast-moving units with almost complete freedom of manœuvre, we arrive at conditions analogous to those existing in sea warfare, without the submarine or the torpedo, when a decision is reached by the destruction or immobilisation of the fighting units. Turning for a moment to the sea battle, it appears certain that the destruction of a battleship would be accomplished with greater certainty by high explosive than by gas, and that it would not be worth while surrendering any hitting power for gas. But bearing in mind the brief vital moments of a long-range naval action and the possibility of dislocating the fighting organisation of a battleship, perhaps gas may not be altogether a negligible factor, and may offer chances of some brilliant stroke of opportunism.

There is no need to emphasise the danger of conventional dogmatism about a new weapon. It is well illustrated by a German report on a successful gas operation in 1918, which ends thus: 'Even

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though the British have so often violated the technical laws of gas warfare as regards wind conditions on other occasions, it is still surprising that they should have carried out a gas projector attack on the night in question. . . .' Needless to say it was the surprise that produced the success.

Whatever may be the part of gas in the encounter battle of the future by land or by sea, as the fighting forces become more and more complex, their maintenance will entail the existence of ever-increasing organisations in their rear—dockyards, bases, railheads, supply parks and aerodromes—which from their size, their permanence, and their nature are admirable targets for attack by persistent gases. In many cases they would be accessible only to attack by aircraft, and the problem would arise as to the relative value of the destruction caused by a high-explosive bomb and the lasting effects of contamination by a gas bomb, or possibly of spray from an aeroplane. Much would depend on the state of gas defence in bases and rear echelons.

Let us now consider the different phases of a war in rather more detail. The beginnings will be very different in the future from the past; instead of a period when the efforts of each combatant are concentrated on their own mobilisation, an aggressive Power will do its utmost to strike a decisive blow at the outset by means of a mobile force and aircraft, and to paralyse the enemy's preparation, for it is clear that any delay makes victory more uncertain and of more doubtful value. In these initial blows, whether they are struck at political centres or at mobilisation

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centres, gas is likely to be used both on account of its moral effect and of the disorganisation it might produce before defence measures were properly organised. At this stage comparatively small quantities of a persistent gas might have considerable effect at vital points, which might be attacked successfully from the air before anti-aircraft forces had been completely mobilised.

Passing next to the battlefield, in open warfare much will depend on the degree of mobility attained; against infantry and artillery committed to their positions gas will always be effective if it is available at the right moment. But in view of the dependence of gas on weather conditions it may not be considered advisable to carry gas shell in divisional transport, and with the fleeting opportunities offered by an encounter battle, by the time gas arrived the chance for its use might have passed. However, the availability of gas might be much enhanced by means of tanks and aircraft.[1] Tanks might contaminate roads and important positions, or form obstacles with mustard gas, which it would be dangerous to cross and impossible to occupy without the risk of heavy casualties. Low-flying aeroplanes might drop gas bombs on cover or might spray woods likely to contain troops, or even spray troops themselves moving in close order behind the front. There are many other possibilities, *e.g.* the use of mustard gas against bivouacs and billets, or the use of projectors brought up by carrier tanks

[1] The average gas shell contains less than ten per cent. of its weight of gas, while aeroplane bombs might contain a much larger percentage.

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in local attacks. The problem in mobile warfare is mainly whether gas can be made available at the right moment in sufficient quantity; that is a question of military transport which I am not qualified to answer.

If a war were protracted and the opposing forces grew in size, the time taken for an encounter battle to develop might increase and offer a better opportunity for gas, and there would necessarily come static periods when a state of position warfare would recur and gas could be used with greater ease and effect in forward areas. As a force grew, its rear organisation would become more vulnerable, and yet so vital to its existence that it may be quite impossible in the future to maintain in the field such forces as fought on the Western Front, in view of the development of gas, aircraft and tanks. Much would turn on the mobility of transport; if this were independent of roads and railways the use of gas would be more difficult against supply lines, except when natural obstacles enforced a particular route. The problems of chemical warfare in the future are thus bound up most intimately with the mobility of the forces engaged, with this complication, that the tank and the aeroplane may themselves become the chief means by which gas is distributed.

But in spite of all uncertainties, and I admit there are many, there can be no doubt that chemical warfare presents a serious military and naval problem, which demands effective measures of defence, reinforced by the possibility of retaliation, without which an enemy might gamble on the use

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of gas. The power to retaliate depends on the existence of a chemical industry, for with this as with so many other weapons a nation's fighting strength is largely conditioned by its industrial strength. Defence measures must, therefore, include industrial development, even to the extent of maintaining uneconomic plants which may be in excess of the world's needs at the moment. From the standpoint of waste such plants are in the same position as armaments. Economic pressure, however, is likely to bring its own solution of this difficulty in the shape of international agreements delimiting markets and supplies of raw materials. The possibility of such agreements is dependent on the organisation of an industry in each country in some form of trust, and the placing of such great industrial power in a few hands is still regarded with some suspicion. But the modern trust, based largely on the advantages of pooling resources and research and of preventing wasteful overlapping, is a guarantee of efficiency and of stability, which gives security to labour, while it admits of international agreements as to markets and raw materials, thus eliminating one of the most likely causes of war in the future between democracies. War and industry, the two great destructive and constructive agents, are very closely related. War has wrought many changes in industry, and as a reaction industry may supply the surest guarantees of peace.

Since these words were written a combination has been formed by the leading chemical firms of this country, which has great significance both for our

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industrial strength and for the problem of national defence, since the war value of an industry like its peace value depends largely on its organisation.

But to return to my main topic. The outstanding fact in the history of gas warfare is the dependence of its effects on the state of protection of the troops exposed to gas. Against untrained and unprotected troops even a harmless lachrymator will be decisive. And so long as it is necessary to maintain the armed forces of the Crown, it will be necessary to equip them with the most efficient means of gas protection which science can provide, and to maintain their gas discipline at a high level. To omit to do so is to invite disaster. Gas defence cannot be improvised hastily, gas training demands a long apprenticeship.

But of no less importance is the existence of a properly informed public opinion, capable of forming a sane judgment, unbiassed by panic or prejudice, on a problem which at any time may once more become of vital moment to the safety of the Empire.

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Editorial Note

The preceding chapters will, it is hoped, provide food for thought and prove convincingly a need for universal study of the nature and of the conduct of warfare under present-day conditions.

There remains the question of the educational stage at which the subject should be studied. The concluding paper provides some useful suggestions under this heading.

Editor.

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WHAT SHOULD WE TEACH ABOUT WAR?

BY G. F. BRIDGE

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WHAT SHOULD WE TEACH ABOUT WAR?

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THE answer given by many teachers of history to this question will be: Nothing except the facts. For there are many teachers who hold that they have nothing to do with ethical questions. When, during that period which assuredly will be regarded by the future historian as one of the most curious phases in the story of the Great War and its aftermath, the period, namely, of 'Reconstruction,' the educational associations were issuing manifestoes, each proving that its own subject was the most important in the curriculum, the Historical Association refused to include in its declaration of faith any reference to ethical teaching, a suggestion to that effect made at the general meeting finding no support whatsoever.

But though men and women—or at least, teachers—may study history in the cold white light of pure intellect, caring for nothing but objective truth, it is certain that children cannot do so. The truth rather is that young children are not able to fasten their minds on to history at all, and history will make no impression on them unless their feelings are stirred. Their principal interest, next after the mere interest of listening to a story, is in the

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character of the men and women about whom they hear and read, and the questions they ask are whether the heroes and heroines of historical narratives deserved praise, blame, pity, admiration, or what not. As children develop into boys and girls, their power of grasping factual truth and distinguishing between it and feeling increases, but probably few young people even of 16 and 17 feel much interest in any history which rouses no emotion. Indeed, how many adults who are not professed students of history do? If, then, historical characters and historical narratives are continually exciting feeling, surely it is the business of the teacher to guide and inform that feeling. This is recognised at present in the case of one feeling only, namely, patriotism. It is generally agreed that one object of teaching history is to stimulate patriotism. But were we not taught during the war that 'patriotism is not enough'?

Another simple answer to the question, and one which undoubtedly some people would give without hesitation, would be: we should teach them that war is always a crime and that they should loathe and detest it. Unfortunately in this tangled world there is no such thing as a simple answer to any question, least of all in education. In the first place we may tell children that war is a crime, but we cannot make them believe it, and most of them probably would not believe it. For, so at least children would reason, if war is a crime, soldiers must be criminals, which clearly they are not. Or if the children are old enough to discriminate

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between the governments who give orders and the soldiers who merely obey, then the rulers and statesmen who engage in wars must be criminals, which again most sensible children would stoutly, if silently, refuse to believe. But, someone will say, cannot older children at all events be taught that war is always wrong, in the sense that whenever there has been war, someone has been in the wrong, so that all wars have been due to wrongdoing somewhere? But this is more difficult than appears at first sight. Thomas Hill Green, in his 'Principles of Political Obligation,' essayed to prove this thesis, but everyone who has weighed his argument must feel that it is unsatisfying. It breaks down over such events as the Balkan Wars which drove the Turks nearly out of Europe, and the wars which drove the Austrians out of Italy. We certainly cannot say that the men who were fighting for their freedom from foreign domination were wrong, but can we say that the other side were wrong in fighting to maintain a position which Europe had recognised as theirs by right; in the case of the Turks, for some hundreds of years? No doubt we can go farther back and argue that these conflicts were due to the original wrongdoing of Turks and Austrians in invading and occupying territories to which they had no right. But if we said that to a Turk or an Austrian, might he not reply by politely hinting that our position in Ireland was closely analogous to theirs in Bulgaria and Lombardy, and by declining to repent in sackcloth and ashes of ancestral crimes which civilisation had condoned? Many wars, in

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fact, have not been due to wrongdoing on either side, but have been the clash, not of right with wrong, but of right with right. Who were right in the great religious wars—the men who fought for the unity of the Church or the men who fought for liberty of conscience? Each side fought for the right as they saw it. Who was right in 1792—the men who fought for the right of each nation to establish its own government, or the men who fought to prevent the spread of anarchy in Europe? Each side fought for the right as they saw it. Have historians yet agreed about the right and wrong of the Crimean War? or the war of 1870? or our own South African War? In many cases our view as to which was the guilty party will depend on the value we attach to the ideals for which either party contended.

Where civil wars are concerned, the impossibility of condemning one or both sides is at least as great. No one nowadays, surely, will hold either King or Parliament guilty of the blood shed in the Civil War of the seventeenth century. That war was the clash of contending ideals in Church and State, each worthy of all respect, and he would be audacious indeed who would say that war could have been avoided. Or take the case of the American Civil War. Though probably the sympathies of every reader of this paper are with the North, yet it is impossible to deny that the South had a strong case, and that its men, speaking broadly, fought with as sincere a conviction of the justice of their cause as their opponents.

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Here, then, is one great truth which masters and mistresses can teach about war—namely, that men have frequently fought and killed one another, not because they loved fighting and killing, nor from any evil motive—greed, hatred, or lust of power—but because they differed sincerely in their convictions of right and wrong, and because they held those convictions with such intensity that they would rather die—and, what is harder to some people, kill other people—than give them up, and that wars fought in this spirit, so far from being anything for us to be ashamed of, are amongst the glories of the history of our race. And if a child asks, as a sharp child in these days very well might, why such differences could not be submitted to a court of justice, or to arbitration, the answer is that there are some questions on which no verdict of a court will carry any weight, because on such questions conscience is the only court which the individual will recognise. We can answer further that there have been evils (and the same thing may happen again) which good and peace-loving men have deemed to be worse than war, and for the sweeping of which off the face of the earth even the destruction and suffering caused by long civil war is not too high a price to pay. Indeed, boys and girls ought to be taught—what the world in its present peace-at-any-price mood is in danger of forgetting—that wrong and injustice are worse than war, and that we ought to hate wrong and injustice more than we hate war, and choose war rather than the sufferance of wrong and injustice. 'The reverence for

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human life,' says James Martineau, 'is carried to an immoral idolatry when it is held more sacred than justice and right, and when the spectacle of blood becomes more horrible than the sight of desolating tyrannies and triumphant hypocrisies. . . . All law, all polity, is a proclamation that justice is better than life, and if need be, shall override it and all the possessions it includes; and nothing can be weaker or more suicidal than for men who are citizens of a commonwealth to announce that, for their part, they mean to hold life in higher esteem than justice.'[1] And so, if the day comes when nations are content to submit every dispute, whatever be its origin, to the decision of a court, it may be not that the world has got better, but that men have become meaner and baser, because there is no longer anything that they hold dearer than life.

But assuredly not all wars have been conflicts between divergent ideals of right. There have been many struggles for trade or struggles for territory, of which the best we can say is that they were felt at the time as inevitable incidents in the outward movement and expansion of European nations, that there is good hope that such struggles may really be avoided in the future, and that they ought to be avoided, because usually no principle of right and wrong is involved. Further, there are many peace-breakers whom no teacher need hesitate to condemn. The only defence we can make for Edward III or Henry V is that in their day it was looked upon as right and natural that kings should

[1] 'Ethics of Christendom,' in *Studies of Christianity*.

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make war to assert their own personal rights, regardless of the interests of their subjects. This is the line taken by Shakespeare in 'Henry the Fifth'; the argument may have been acceptable to an Elizabethan audience, but it is intolerable to us, and whoever reads that most entrancing play with boys and girls should make that clear. Equally intolerable to us would be the ethics of a greater man than Henry V, namely Oliver Cromwell. He stated his reason for going to war with Spain in blunt terms to his Parliament, 'Why truly, your great enemy is the Spaniard. He is a natural enemy; he is naturally so throughout, by reason of that enmity that is in him against whatsoever is of God,' and again, 'The Spaniard is your enemy providentially,' that is, by the ordering of Providence. We do not believe now in the inherent wickedness of those who hold a form of the Christian faith differing from our own, nor in enemies who are made eternally such by decree of the Almighty.

And yet, while we claim to have outgrown Oliver's ethics and while we condemn Frederick, Louis XIV and Napoleon as needless peace-breakers, it is vain to deny that we find ourselves confronted with serious problems. What if Oliver had not fought Spain? if Frederick had not fought Austria? if Napoleon had never lived? Would the world have reached its present level of peace and civilisation? Would the great nations of modern Europe have won their way to internal unity? If war has been frequently a curse, has it not been also frequently a blessing, and the source of blessings?

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Would the rotten old German 'particularismus' have ever been swept away if statesmen and rulers had always held that German unity was not worth one single drop of German blood? Was there nothing in Bismarck's 'nur mit Blut und Eisen' theory? These are deep questions, to discuss which is impossible in a brief article; all that can be said is that the wise and thoughtful teacher of history will ponder on them and give his or her pupils such inkling of them as suits their age and intelligence.

Let us return to something that is easier. The duty of the teacher in treating of wars seems to be fairly clear: it is neither to condemn nor to glorify wholesale, but to discriminate, to lead boys and girls to ask about every war whether it was necessary, whether it was, looking at it from the point of view of their own country, fought in a good cause or a bad—whether it was worth the inevitable suffering it caused. Or whether it might have been avoided if a better temper had prevailed on one side or the other, or both, or if there had been a readiness anywhere to give up something. Or, at least, had the war any legitimate or excusable feeling behind it, whether of lawful ambition or of resentment for wrong done? Or was it merely a war of unscrupulous aggression or of personal ambition? Did it spring from mere national selfishness or greed? And of the peace that ended the war we may inquire whether it was a just, fair, and honourable peace, and one calculated to benefit the world, and whether the victors accomplished the aims in pursuit of which they had set out.

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And something more we may do. We may show boys and girls how the conscience of the world about war has changed, and is changing. There may be wars again; but it is fairly safe to say that there will never be a war except for some exceedingly strong reason. A sense of the terrible seriousness of armed conflict has come over Europe. That callousness to human suffering which shocks us so frequently in the record of past centuries, has yielded to the forces of religion, democracy, and education. About the inevitableness of all the wars of the nineteenth century opinions no doubt differ, and will continue to differ. But at least it may be said that none of them was fought except from a sincere conviction that some great national cause demanded it.

War therefore need not be treated as something foul and horrid, of which it is unfortunate that children should have to hear anything, and of which they should certainly hear as little as possible. In some textbooks, no doubt, war has occupied a disproportionate space, but such exaggeration is probably not the special danger of the moment. What is to be feared is rather that teachers will drive war so much into the background that young people will fail to realise through what struggles and strivings, at the cost of what blood and tears, humanity has got so far on its journey, and that, if we lay excessive emphasis on the increasing will to peace of the civilised world, they may think that the world will never have to face blood and tears again.

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